

Vol. II
TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1941

No. 37

**THE CUNO ENGINEERING CORPORATION,
PETITIONER,**

vs.

THE AUTOMATIC DEVICES CORPORATION

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT
OF APPEALS FOR THE SECOND CIRCUIT

PETITION FOR CERTIORARI FILED MARCH 15, 1941.

CERTIORARI GRANTED APRIL 14, 1941.

SUPREME COURT OF THE UNITED STATES

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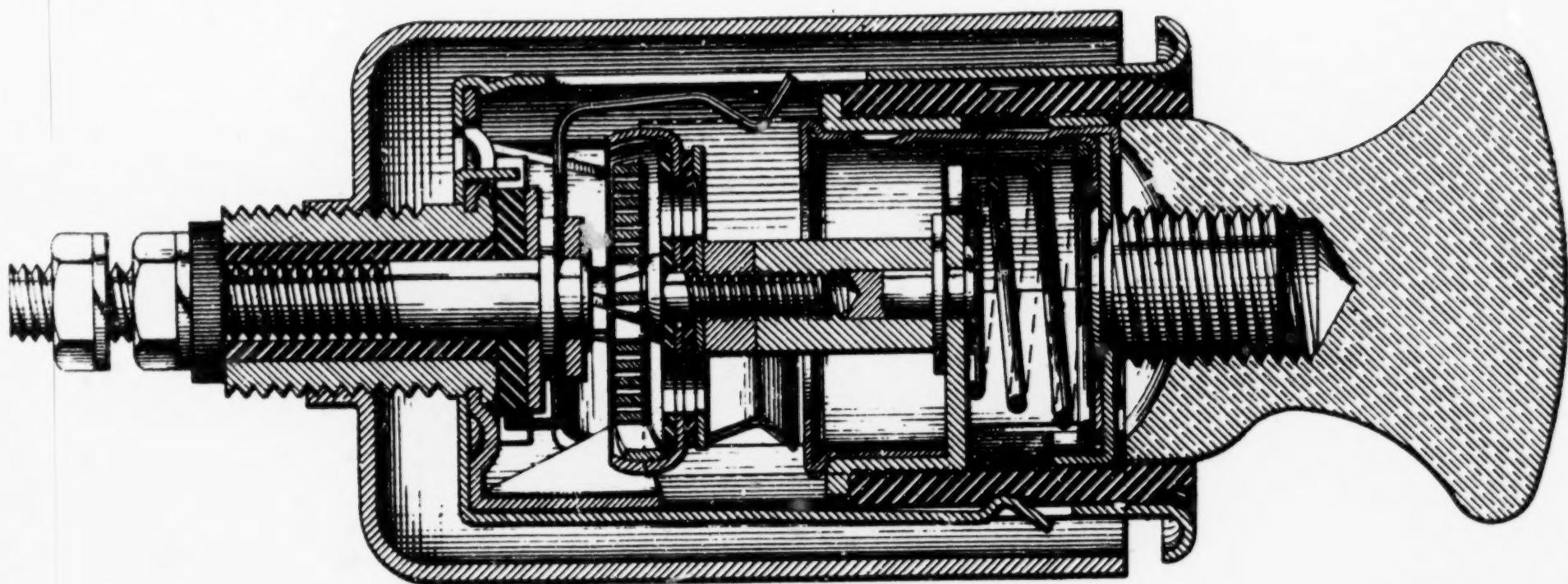
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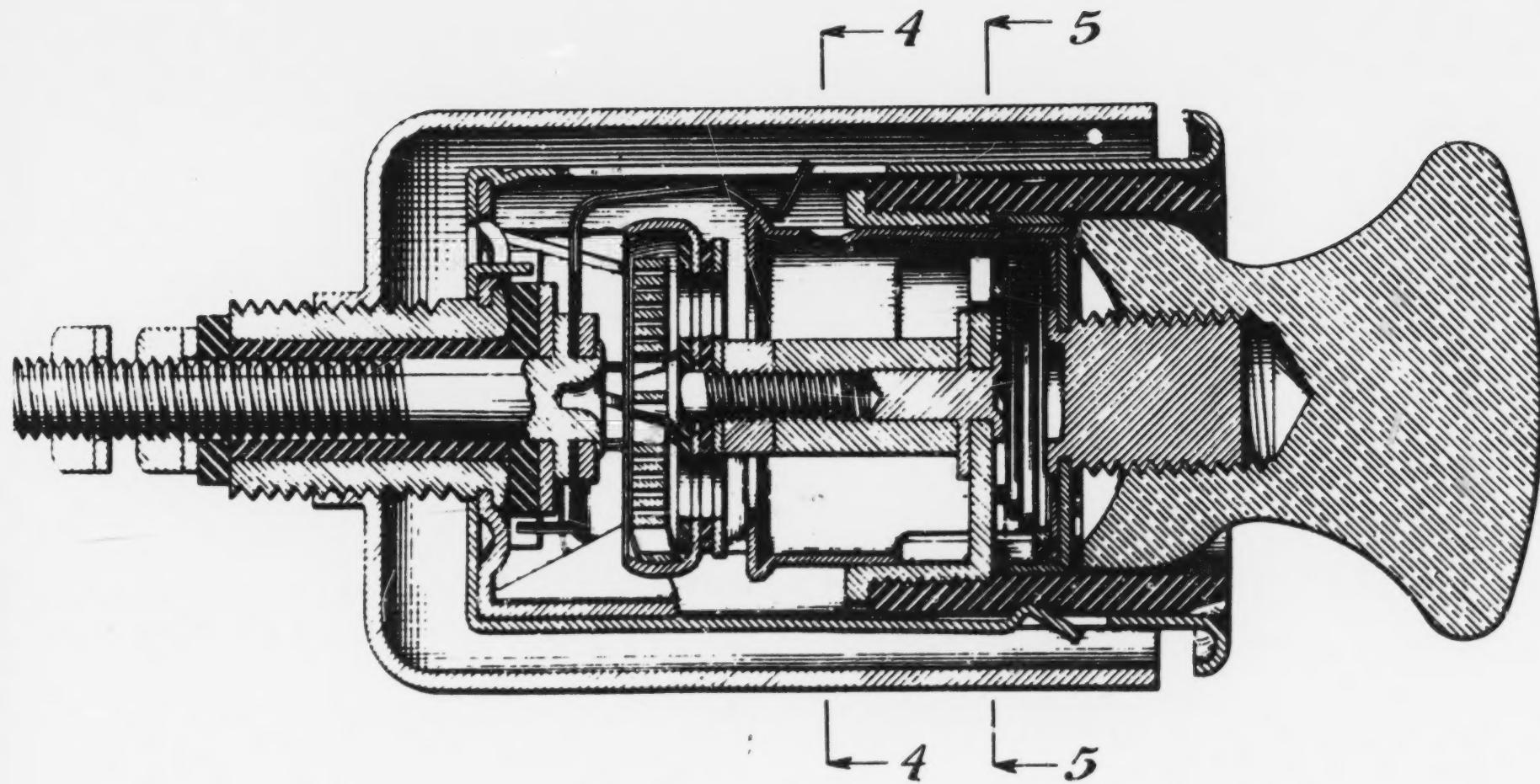
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JUDD & DETWEILER (INC.), PRINTERS, WASHINGTON, D. C., JULY 25, 1941.

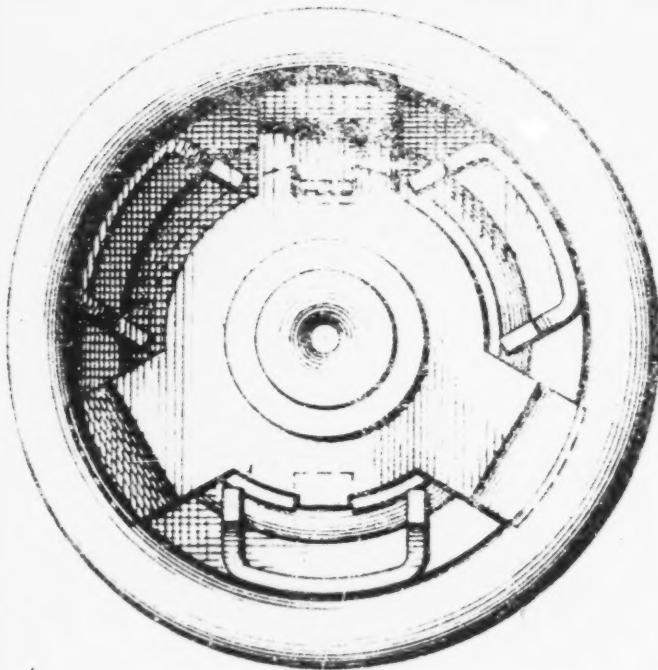
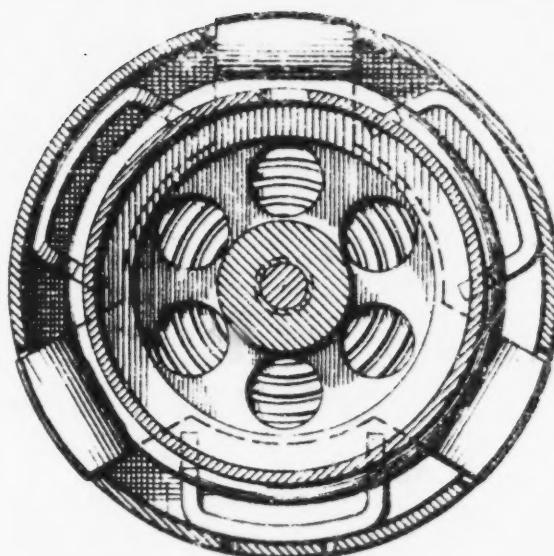
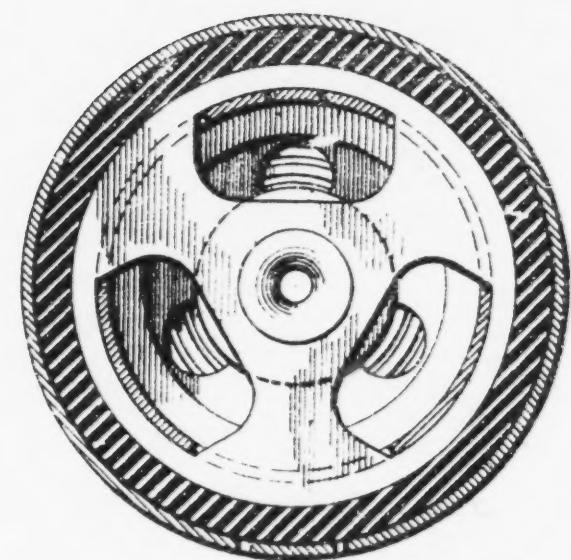
Fig. 1

*Cuno Automatic Cigar Lighter
February, 1939*

Fig. 2



Cuno Automatic Cigar Lighter
February, 1939

Fig. 3*Fig. 4**Fig. 5*

*Cuno Automatic Cigar Lighter
February, 1939*

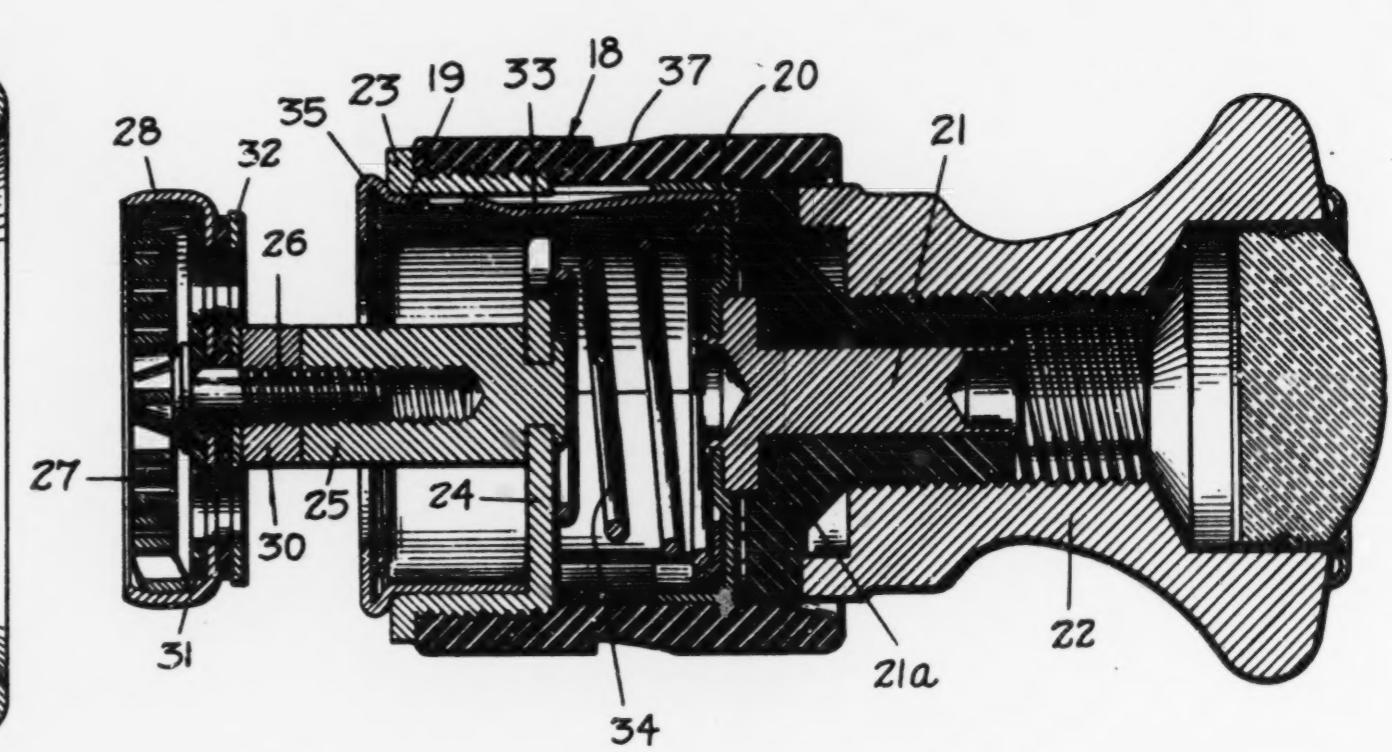
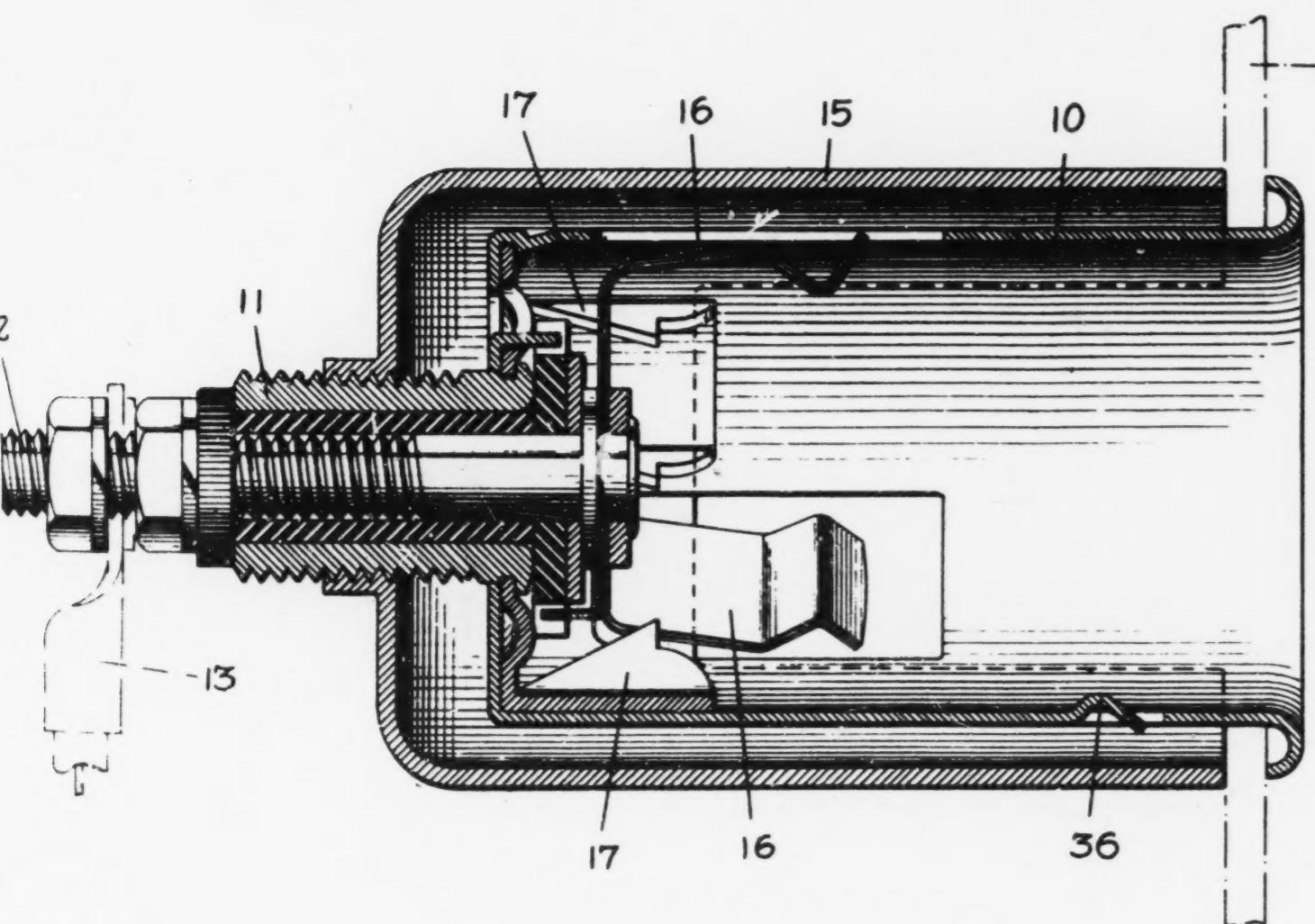
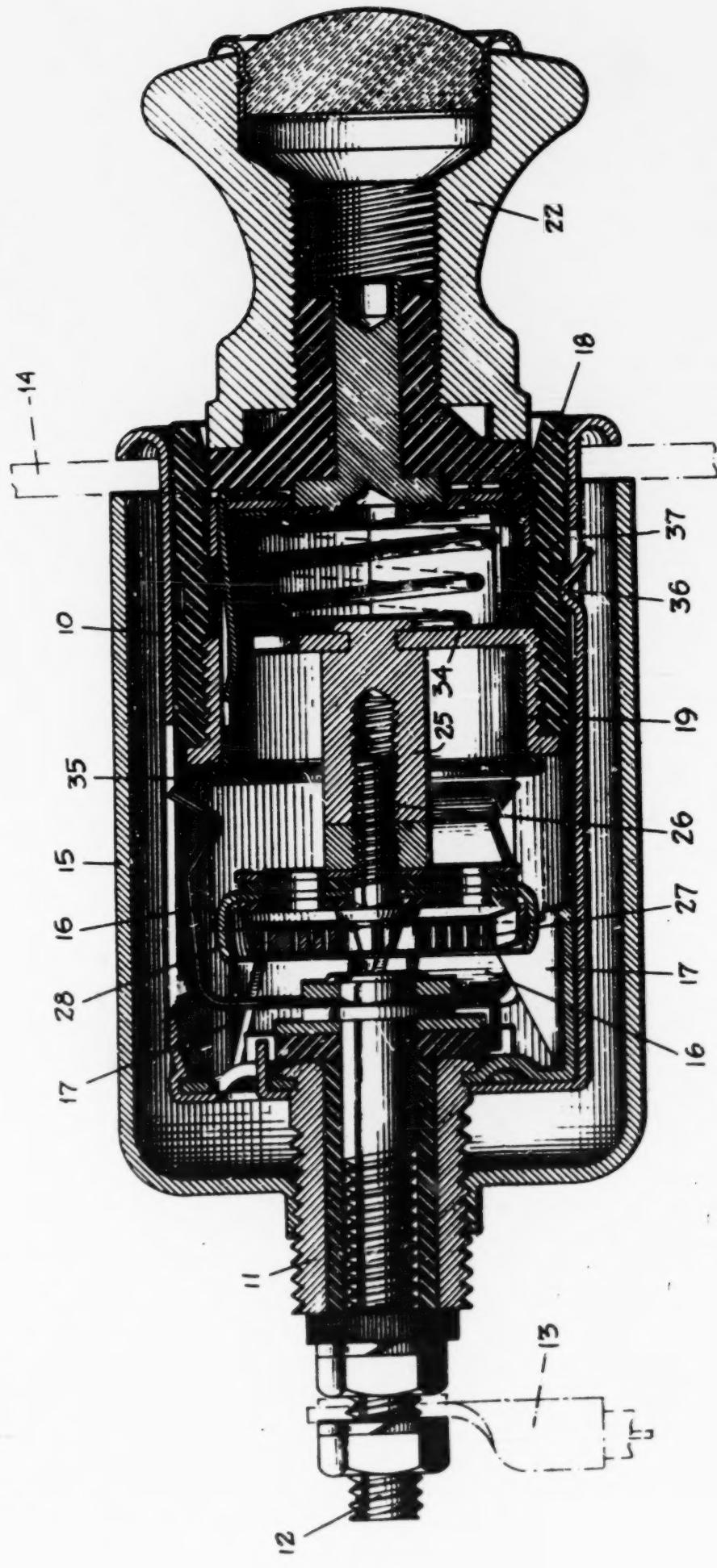
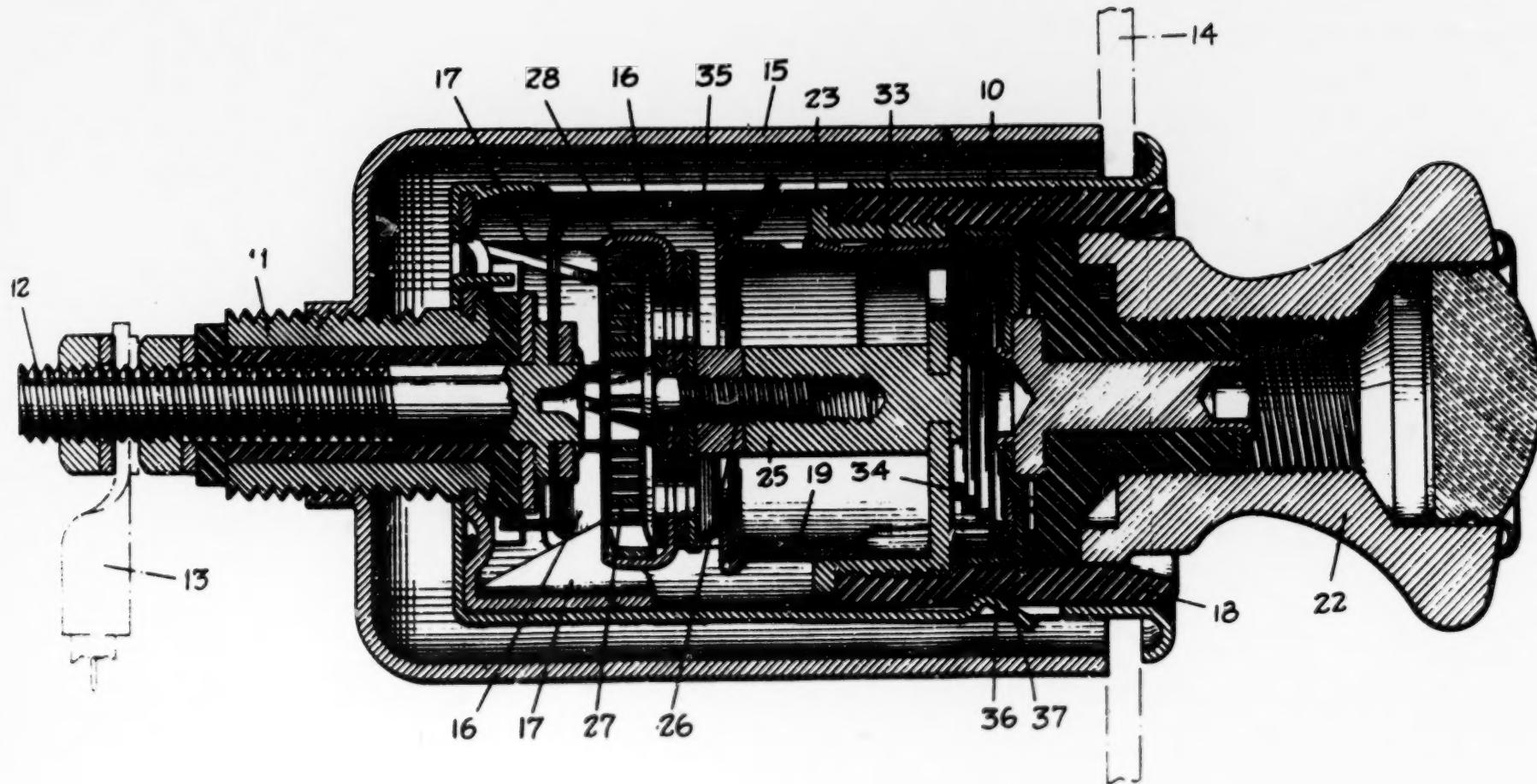
Exhibit 1A

Exhibit 1B



Cuno Automatic Cigar Lighter

Exhibit 1C



Cuno Automatic Cigar Lighter

[fol. 347]

PLAINTIFF'S EXHIBIT No. 3.

(Copy)

License Agreement

This Agreement, made this 1st day of May, 1936, by and between Automatic Devices Corporation, a corporation organized and existing under the laws of the State of Connecticut, and having a principal place of business in the City of Bridgeport, County of Fairfield, and State of Connecticut, (hereafter called "Automatic"), and Casco Products Corporation, a corporation organized and existing under the laws of the State of Connecticut, and having a principal place of business in the City of Bridgeport, County of Fairfield and State of Connecticut, (hereafter called "Casco"),

WITNESSETH:

Whereas, Automatic is the owner of the entire right, title and interest in and to letters patent of the United States No. 1,736,544, dated November 19, 1929, Herbert E. Mead, for Cigar Lighters, and letters patent of the Dominion of Canada No. 280,963, dated June 12, 1928, Herbert E. Mead, for Cigar Lighters, and certain applications for letters patent for improvements in automatic lighters; and

Whereas, Casco is desirous of acquiring a license from Automatic to manufacture and sell automatic cigar lighters embodying the inventions of said Mead patents and said applications for patents on improvements thereon.

Now, therefore, in consideration of the sum of One Dollar (\$1.00), and other good and valuable considerations in hand paid by Casco to Automatic, receipt whereof by [fol. 348] Automatic is hereby admitted, the parties have agreed as follows:

I. Automatic grants to Casco a paid-up, royalty-free non-exclusive, non-transferable license to manufacture, use, and/or sell, throughout the United States, the territories thereof, and the Dominion of Canada, automatic cigar lighters embodying the inventions of said letters patent to Mead, U. S. Patent No. 1,736,544, and Canadian Patent No. 280,963, and embodying the inventions of any applications for patent on automatic lighters, or patents eventuating thereon, now owned or at any time hereafter

owned or controlled by Automatic, to the full end of the term or terms for which said patents, reissues, or extensions of said patents have or shall be granted.

II. In lieu of royalties, Casco agrees to pay to Automatic, or to pay for Automatic—(a) any expenses which may be incurred by Automatic in the acquirement of any patents or patent applications on automatic cigar lighters; (b) any expenses which may be incurred by Automatic, or on behalf of Automatic, in filing and prosecuting applications and obtaining patents on automatic lighters which Automatic may acquire; and (c) any expenses which Automatic may incur in filing and prosecuting suits for infringement of the patents of Automatic on automatic cigar lighters.

III. It is expressly understood and agreed by the parties hereto, that the license hereby granted to Casco is non-exclusive and non-transferable, and that Casco shall have no right to license others under said Mead patents, or any patents eventuating on said applications.

IV. This agreement shall be binding upon and inure to the benefit of the successors and legal representatives of the parties hereto.

[fol. 349] In Witness Whereof the parties hereto have executed this agreement by their respective officers thereunto duly authorized, and their respective corporate seals hereunto affixed, as of the day and year first above written.

Automatic Devices Corporation, By (Sgd.) Arthur A. Johnson, President. (Corporate seal.)

Casco Products Corporation, By (Sgd.) Joseph H. Cohen, President. (Corporate seal.)

STATE OF CONNECTICUT,
County of Fairfield, ss:

Arthur A. Johnson, being duly sworn, deposes and says: I am President of Automatic Devices Corporation, the corporation described in and which executed the foregoing instrument. I know the seal of said corporation and the seal impressed above is the corporate seal of said corporation. The said seal was affixed by order of the Board of

Directors of the said corporation. I executed the foregoing instrument on behalf of said corporation as its President and by authority vested in me by its Board of Directors.

(Sgd.) Arthur A. Johnson.

Subscribed and sworn to before me this 1st day of May, 1936. (Sgd.) Anne Pistey, Notary Public.
(Seal.)

[fol. 350] STATE OF CONNECTICUT,
County of Fairfield, ss:

Joseph H. Cohen, being duly sworn, deposes and says: I am President of Casco Products Corporation, the corporation described in and which executed the foregoing instrument. I know the seal of said corporation and the seal impressed above is the corporate seal of said corporation. The said seal was affixed by order of the Board of Directors of the said corporation. I executed the foregoing instrument on behalf of said corporation as its President and by authority vested in me by its Board of Directors.

(Sgd.) Joseph H. Cohen.

Subscribed and sworn to before me this 1st day of May, 1936. (Sgd.) Anne Pistey, Notary Public.
(Seal.)

(Copy)

License Agreement

This Agreement, made this 23rd day of February, 1939, by and between Automatic Devices Corporation, a corporation organized and existing under the laws of the State of Connecticut, and having a principal place of business in the City of Bridgeport, County of Fairfield, and State of Connecticut, (hereafter called "Automatic"), and Casco Products Corporation, a corporation organized and existing under the laws of the State of Connecticut, and having a principal place of business in the City of Bridgeport, County of Fairfield, and State of Connecticut, (hereafter called "Casco"),

Witnesseth:

Whereas, Automatic is the owner of the entire right, title and interest in and to the following letters patent of the United States—

Patent No.	Granted	Inventor	Title
2,117,232	May 10, 1938	J. H. Cohen	Cigar Lighter
2,117,703	May 17, 1938	J. H. Cohen	Cigar Lighter
2,129,374	Sep. 6, 1938	A. A. Johnson	Electric Cigar Lighter
2,137,195	Nov. 15, 1938	J. H. Cohen	Cigar Lighter
2,140,311	Dec. 13, 1938	J. H. Cohen	Cigar Lighter

and letters patent of the Dominion of Canada—

Patent No.	Granted	Inventor	Title
358,461	June 9, 1936	J. H. Cohen	Cigar Lighters
376,974	Oct. 11, 1938	G. F. Bahr	Cigar Lighters

Whereas, Casco is desirous of acquiring a license from Automatic to manufacture and sell automatic cigar lighters embodying the inventions of said above-enumerated patents.

Now, Therefore, in consideration of the sum of One Dollar (\$1.00), and other good and valuable considerations in hand paid by Casco to Automatic, receipt whereof by Automatic is hereby admitted, the parties have agreed as follows:

[fol. 352] 1. Automatic, in accordance with the provisions of Paragraph numbered "I" of the license agreement made the 1st day of May, 1936 between the parties hereto, has granted and hereby grants to Casco, and Casco accepts, a paid-up, royalty-free, non-exclusive, non-transferable license to manufacture, use, and/or sell, throughout the United States, the territories thereof, and the Dominion of Canada, automatic cigar lighters embodying the inventions of said U. S. letters patent to Cohen, No. 2,117,232; Cohen, No. 2,117,703; Johnson, No. 2,129,374; Cohen, No. 2,137,195; and Cohen, No. 2,140,311; and Canadian letters patent to Cohen, No. 358,461 and Bahr, No. 376,974, to the full end of the term or terms for which said patents, reissues, or extensions of said patents have or shall be granted.

2. In lieu of royalties, Casco agrees to pay to Automatic, or to pay for Automatic—(a) any expenses which may be

incurred by Automatic in the acquirement of any patents or patent applications on automatic cigar lighters; (b) any expenses which may be incurred by Automatic, or on behalf of Automatic, in filing and prosecuting applications and obtaining patents on automatic lighters which Automatic may acquire; and (c) any expenses which Automatic may incur in filing and prosecuting suits for infringement of the patents of Automatic on automatic cigar lighters.

3. It is expressly understood and agreed by the parties hereto, that the license hereby granted to Casco is non-exclusive and non-transferable, and that Casco shall have no right to license others under said patents.

4. This agreement shall be binding upon and inure to the benefit of the successors and legal representatives of the parties hereto.

[fol. 353] In Witness Whereof, the parties hereto have executed this agreement by their respective officers thereunto duly authorized, and their respective corporate seals hereunto affixed, as of the day and year first above written.

Automatic Devices Corporation, by (sgd.) Arthur A. Johnson, President. (Corporate Seal.) Casco Products Corporation, by (sgd.) Joseph H. Cohen, President. (Corporate Seal.)

STATE OF CONNECTICUT,
County of Fairfield, ss.:

Arthur A. Johnson, being duly sworn, deposes and says: I am President of Automatic Devices Corporation, the corporation described in and which executed the foregoing instrument. I know the seal of said corporation and the seal impressed above is the corporate seal of said corporation. The said seal was affixed by order of the Board of Directors of the said corporation. I executed the foregoing instrument on behalf of said corporation as its President and by authority vested in me by its Board of Directors.

(Sgd.) Arthur A. Johnson.

Subscribed and sworn to before me this 23rd day of February, 1939. (Sgd.) Anne Pistey, Notary Public. (Seal)

[fol. 354] STATE OF CONNECTICUT,
County of Fairfield, ss.:

Joseph H. Cohen, being duly sworn, deposes and says: I am President of Casco Products Corporation, the corporation described in and which executed the foregoing instrument. I know the seal of said corporation and the seal impressed above is the corporate seal of said corporation. The said seal was affixed by order of the Board of Directors of the said corporation. I executed the foregoing instrument on behalf of said corporation as its President and by authority vested in me by its Board of Directors.

(Sgd.) Joseph H. Cohen.

Subscribed and sworn to before me this 23rd day of February, 1939. (Sgd.) Anne Pistey, Notary Public. (Seal!)

Nov. 19, 1929.

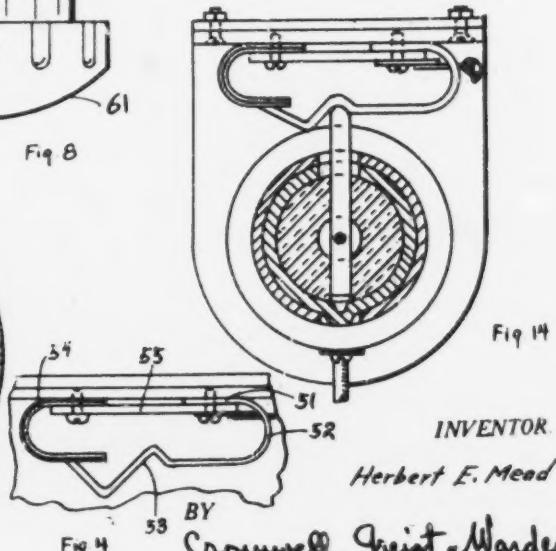
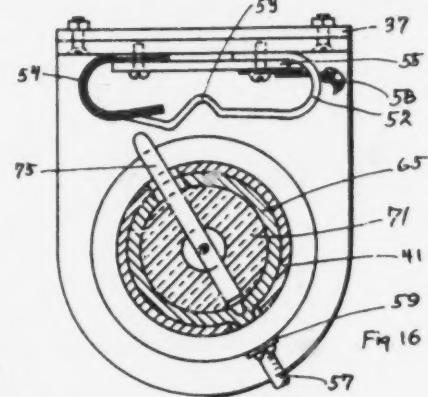
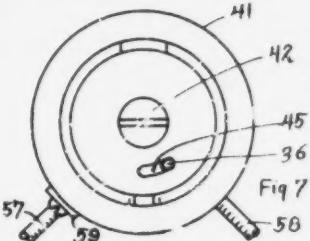
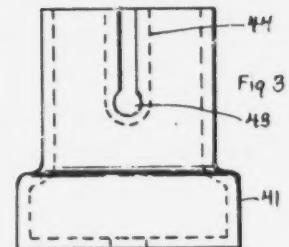
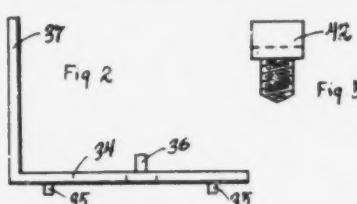
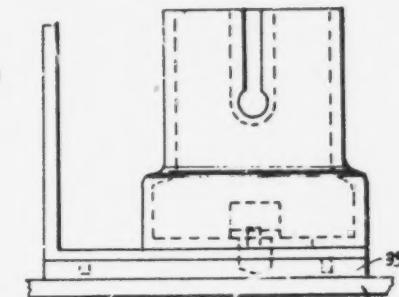
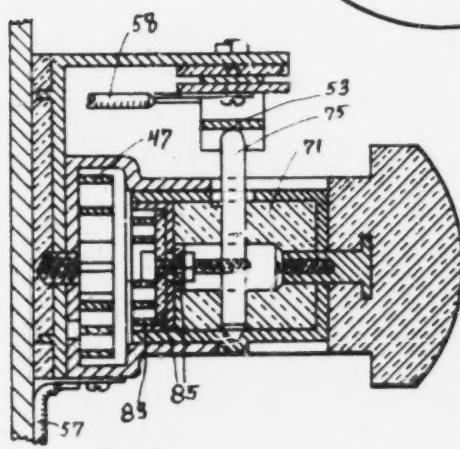
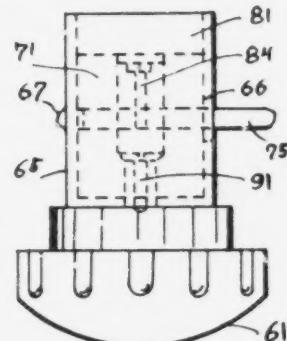
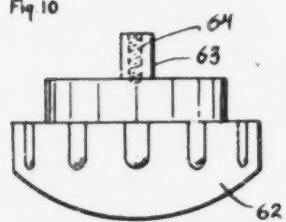
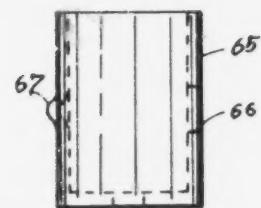
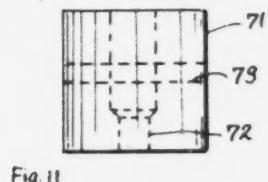
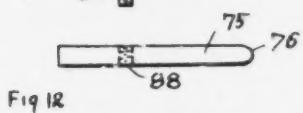
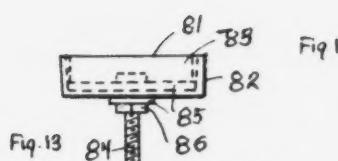
H. E. MEAD

1,736,544

CIGAR LIGHTER

Filed Aug. 24, 1927

2 Sheets-Sheet 1



INVENTOR

Herbert E. Mead

Cromwell, Greist & Warner

ATTORNEY.

290

Nov. 19, 1929.

H. E. MEAD

1,736,544

CIGAR LIGHTER

Filed Aug. 24, 1927

2 Sheets-Sheet 2

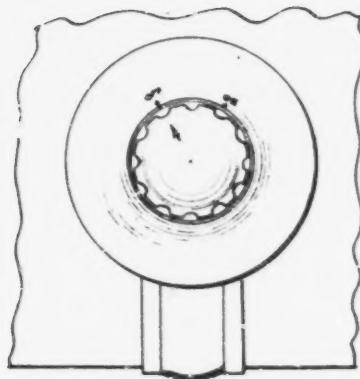


Fig. 17

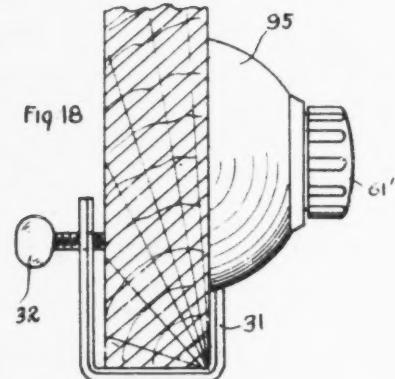


Fig. 18

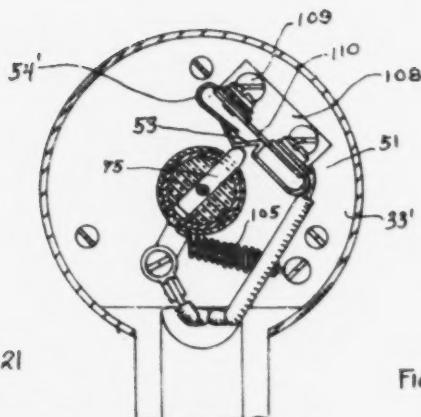


Fig. 21

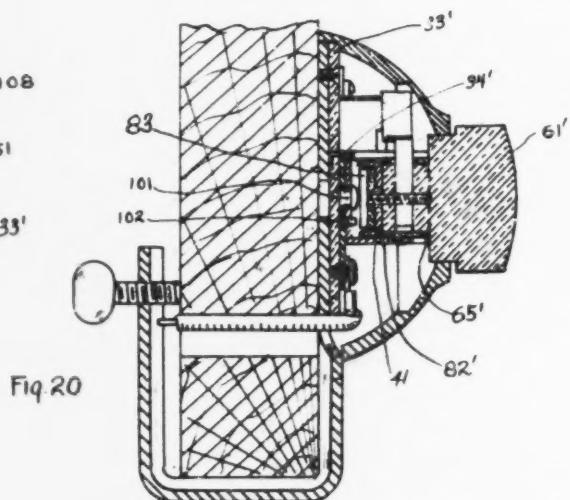


Fig. 20

Fig. 19

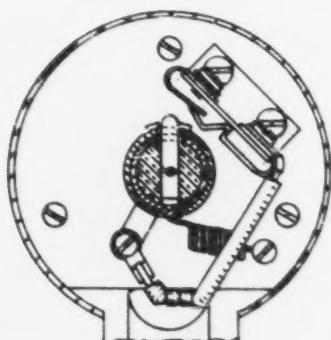
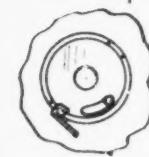


Fig. 22



Fig. 23



INVENTOR
Herbert E Mead
by Cromwell, Great Warden
ATTORNEY

UNITED STATES PATENT OFFICE

HERBERT E. MEAD, OF DETROIT, MICHIGAN, ASSIGNOR TO S. T. JESSOP CO., INC., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

CIGAR LIGHTER

Application filed August 24, 1927. Serial No. 215,236.

This invention relates to cigar lighters or devices of a similar nature wherein a member is arranged to be electrically heated to incandescence to be used for lighting cigars and the like.

Among the objects of the invention is a device of the above described character which is extremely simple and cheap in manufacture and more efficient than the devices used heretofore. The lighter, according to the invention, comprises a base unit and a plug removably mounted in the base unit. The plug carries a resistance coil that may be heated to incandescence to serve as a lighting medium. The base has a socket for receiving the plug, the socket with the plug being movable on the base between a position where the coil is energized and a position where the coil is de-energized. Normally the socket and the plug are held in a position where no current will flow through the heating coil. If the coil is to be heated for lighting purposes, the plug and the socket are moved to the energizing position where they are held locked until the heating coil has reached the desired temperature. A thermostatic element responsive to the temperature condition of the heating coil releases the engagement of the socket and plug in locked position whereupon the same are returned to the original position so that the plug may be removed and serve its purpose.

The lighter according to the invention embodies, in addition to the principles of construction and operation described above, a number of other new features constituting distinct objects of the invention and contributing to the simplicity of construction and the cheapness of manufacture, as well as the effectiveness of the operation of the same. These objects will be best understood from the following description of exemplifications of the invention, reference being had to the accompanying drawings, wherein

Fig. 1 is a side elevational view of the base assembly of a lighter embodying the invention;

Fig. 2 is a similar view of the base plate of the assembly in Fig. 1;

Fig. 3 is a similar view of the socket;

Fig. 4 is a top elevational view of the locking unit with thermostatic release element;

Fig. 5 is an elevational view of the pivot screw used to hold the socket and base to the supporting plate;

Fig. 6 is a top elevational view of the biasing spring which tends to hold the socket in off position;

Fig. 7 is a top view of the socket in mounted position with the spring removed;

Fig. 8 is a side elevation view of the assembled lighting plug;

Fig. 9 is a similar view of the plug knob;

Fig. 10 is a similar view of the plug shell that is held on the knob;

Fig. 11 is a similar view of the porcelain core of the plug;

Fig. 12 is an elevation of the latch pin of the plug;

Fig. 13 is a side elevation of the heating unit of the plug;

Fig. 14 is a transverse sectional view through the lighter with the plug held in the socket in the on position;

Fig. 15 is a central sectional view through the lighter showing the plug mounted within the socket;

Fig. 16 is a view similar to Fig. 14 but with the socket and plug in the off position;

Fig. 17 is a top elevational view of the completely assembled lighter mounted on a dash board;

Fig. 18 is a side elevation of the completely mounted lighter;

Figs. 19, 20 and 21 are views similar to Figs. 14, 15 and 16, respectively, of a lighter of somewhat modified construction;

Figs. 22 and 23 are top elevational views of the base socket in the modification of Figs. 19 to 21 with the socket in the on and off positions.

Referring to the drawings, a cigar lighter is shown of a type suitable for use on dash boards of automobiles, the lighter comprising a metallic supporting plate 31 having a U-shaped extension adapted to overlap the dash board and arranged to be clamped thereto as by means of a clamping screw 32, as seen in Fig. 18. The supporting plate 31 carries a base unit or base assembly of the

lighter, as shown in Fig. 1, the base assembly being illustrated in Figs. 2 to 7.

The base assembly comprises a fiber or other insulating plate 33 adapted to be secured to the supporting plate 31. Mounted in the center of the fiber plate 33 is a socket carrier 34, Fig. 2, which consists of a brass stamping having two outwardly turned lugs 35 for anchoring in the fiber plate 33, and an upstanding lug 36 adapted to engage a slot in the socket referred to hereinafter. The socket carrier has a central hole and on one side thereof there is an upstanding bracket 37.

Mounted on the socket carrier is a socket 41, Fig. 3, in the form of a cup-shaped metallic cylinder having a closed bottom with a central opening through which it is rotatably secured above the carrier as by means of a pivot screw 42, Fig. 5. One side of the socket cylinder has a perforation 43 and the opposite side thereof has a slot 44 referred to hereinafter. The bottom of the socket has also a circular slot 45, Fig. 7, into which the upstanding lug 36 of the socket carrier projects to limit the rotary movement of the socket around the pivot screw 42. A spiral biasing spring 47 having its inner end anchored in the head of the screw 42 and its outer end secured to the wall of the socket 41 tends to hold the socket in one end position as determined by the lug 36 which thus acts as a stop, this position corresponding to the off position of the lighter. The lower part 35 of the socket surrounding the spiral biasing spring 47 is somewhat bulged in order to accommodate the spring.

The bracket 37 of the socket carrier has insulatingly mounted thereon a latch and release element 51 comprising a latch or catch spring 52, of phosphorous bronze for instance, having a folded end portion 53 adapted to act as a catch when held in the bent-away position by means of a thermostatic element such as a bimetallic strip 54. The catch spring 52 and the bimetallic strip of the spring 54 are suitably mounted on a supporting plate 55 which is insulatingly secured to the bracket 37.

The several parts described above are readily assembled into the complete base unit by simply screwing the latch unit to the upright part of the socket carrier; placing the pivot screw 42 in the base opening of the socket 41 and screwing it over the socket carrier on the fiber plate 33; and placing the spiral spring within the lower bulged portion of the socket. The base has also two supply connections in the form of two conductors 57 and 58 leading from a source of electric energy to a terminal extension 59 of the socket carrier and to the latch plate 55, respectively.

Within the socket 41 there is removably mounted a plug unit 61 shown completely as-

sembled in Fig. 8 and having its several parts illustrated in Figs. 9 to 12. The plug comprises a knob 62 of suitable insulating material, such as bakelite, having a molded-in central square brass pin 63 provided with a longitudinal tapped perforation 64. The knob has mounted thereon a cylindrical metallic shell 65, stamped and drawn from brass for instance. The shell is open at one end and closed at the other, having at the closed end a square hole fitting over the square pin of the knob. On one side of the side wall of the shell there is a perforation 66 corresponding to the perforation 43 in the socket, and on the opposite side of the shell there is an embossed protuberance 67 adapted to fit into the slot 44 of the socket and engage the same so that upon turning the shell by means of the knob the socket will be rotated on the pivot screw 42.

Within the brass shell 65 there is mounted a core 71 of porcelain or similar material. The core fits the shell and has a longitudinal perforation 72 of which the lower portion fits over the square end of the knob pin 63. Extending transversely through the core at right angles to the longitudinal perforation there is a second perforation 73 in which is mounted a latch pin 75, one end of the latch pin being rounded at 76 for smooth engagement with the spring latch 53. Fitting into the open end of the shell in front of the porcelain core 71 is a heating unit 81 comprising a flat cup-shaped metallic container 82 having mounted therein an insulated spirally-wound heating coil 83, the outer end of which is connected to the walls of the cup and the inner end of which is secured to a central screw 84. The coil and the screw are insulated from the cup as by means of mica washers 85 so that by establishing circuit connections to the walls of the cup 82 and to the screw 84, current may be sent through the coil 83. The coil 83 with the screw 84 are inserted through the perforation in the bottom of the cup 82 and held in place with the mica washers by a nut 86 screwed against the bottom of the cup. The heating unit may thus be readily replaced with little cost.

The heating unit screw 84 is arranged to be threaded into a tapped perforation 88 in the latch pin 75. To assemble the plug the porcelain core 71 is inserted in the brass shell 65 and the two are secured over the square pin in the knob by means of a screw 91. The latch pin 75 is thereupon inserted through the perforation 66 of the shell into the perforation 73 of the core and the heating unit screw 84 screwed in place, thereby firmly locking the latch pin in its position, the perforation 66 of the shell being sufficiently wide to prevent contact of the pin with the shell. Accordingly, with this arrangement the latch pin will act as a terminal connection to the inner end of the heating coil 83 while the

shell will act as a terminal connection to the outer end of the coil. The walls of the cup 82 of the heating unit are preferably somewhat tapered so as to wedge tightly on the inside of the shell 65 when screwed down in place.

When the plug is inserted into the socket, the pin 76 and the protuberance 67 slide into the slots 43 and 44 of the socket, the protuberance 67 serving to drive and rotate the socket when the knob is turned. The width of the slot 44 of the shell is such that the latch pin makes no contacting connection with the walls of the socket.

As explained above, the spiral biasing spring 47 normally holds the socket in the off position as shown in Fig. 11. Accordingly, with the plug inserted into the socket the terminal end 76 of the latch pin will project freely in space and no current will be passing through the heating coil. In order to operate the lighter, the plug is turned to the on position. This brings the projecting end of the latch pin 76 into engagement with the detent of the catch spring 53 which is held pressed outwardly by the metallic strip 54. The socket with the plug are held in this position by the detent against the tension of the spiral biasing spring 47 and in this position a circuit is established from the supply wire 57 through the terminal 59, socket 41, shell 65, heating cup 82, through the heating coil to the screw 84, thence through the spring 53, bimetallic strip 54, to the other supply wire 50. The thermostatic element in the form of the bimetallic strip 54 is so arranged as to hold the latch pin 75 in engagement with the pin 75 until the coil has become heated to incandescence and is ready to be used for lighting cigars or the like.

As the heating coil warms up and becomes incandescent the simultaneously heated bimetallic strip 54 becomes deflected so that the end acting upon the detent 53 turns inwardly towards the supporting plate 55 thereby releasing the latch pin, the relative arrangement being such that the latch pin is not given free until after the heating coil has reached the desired temperature. As soon as the latch pin is released the biasing spring 47 throws the socket with the plug to the off position. The plug may then be removed and the heating coil being at incandescence the cigar or cigarette may be lighted. The on position of the plug and the socket is shown in Fig. 16.

In Figs. 17 and 18 the assembled lighting unit is shown comprising also a dome-shaped shell 95 enclosing the operating elements of the lighter to prevent dust, and the like, from reaching the same.

In the modification of the invention shown in Figs. 19 to 23 the arrangement of the base and of the plug is similar to that of the modification described in the previous figures, the distinctions residing in minor construc-

tional features of the various elements. Thus, the socket 41 is secured to the socket carrier 34 by a rivet 101 which is so arranged as to permit rotary movement of the socket on the rivet shank, a pin 102 serving as a stop to limit said movement. Instead of a spiral biasing spring as used in the first described modification, the socket is normally held in the off position by means of a coil spring 105, one end of which is attached to the socket wall as shown in Figs. 22 and 23, and the other end of which is attached to the fiber base plate 33.

The latch unit 51 is carried on a separate bracket 108 also secured to the fiber plate, as by means of screws 109. The bracket has a perforation 110 to permit the folded detent portion 53 to recede back and unlock the latch when released by the bimetallic thermostat 54.

The plug 61' is also somewhat different from that used in the first described modification in that the shell 65' does not encircle the cup 82' of the heating unit. Fig. 19 shows the position of the socket and plug in the off position while Fig. 21 shows the on position of the lighter, Figs. 22 and 23 illustrating the range of the movement of the socket 41' as limited by the stop formed by the pin 102.

The control action of the thermostatic element 54 depends on the rate at which it is heated while current is being sent through the lighting coil 83. Accordingly, the action of the device will depend on the manner in which the heat control of the thermostatic element will be effected. In some cases the thermostatic element 54 will be heated only by conduction of heat from the heating coil 53 and also by radiation and convection. In other cases it may be preferable to include the thermostatic element 54 in the circuit from the latch pin 75 so that either the entire or part of the heating current must traverse the bimetallic element 54 and heat the same coincidentally with the heating of the lighting coil.

In another modification of the invention, the biasing spring 47 shown in Fig. 6, in connection with the first modification described hereinabove, is made of a thermostatic material, for instance a bimetallic strip which on being heated increases the force with which it acts upon the socket 41 tending to return it to its off-position. Accordingly, when the lighter such as shown in Figs. 14 to 16 but with a biasing spring of thermostatic material, is turned to the on-position, Fig. 14, and the heater spiral 83 is energized and heated, the force exerted by the biasing spring 47 will increase with the rise of the temperature of the heater spiral until the force exerted by it will be sufficient to pull the latch pin 75 off from the engagement with the latch spring 53. In such arrangement, it is not necessary to use the thermostatic element 54.

for upholding the latch spring 53 but an ordinary spring material may be used in making the element 54. However, the thermostatic action of both elements may be utilized with advantage, that is, bimetal may be used both for the element 54 that holds the latch spring 53, as well as for the biasing spring 47, in which case the release of the latch pin 75 from the off-position is determined by the thermostatic action of both thermostatic elements.

Cigar lighters utilizing either one of the foregoing constructions operate very satisfactorily.

When making the biasing spring 47 of thermostatic material, it is often found desirable to use an additional spring 47^a arranged in the interior thereof so as to press the thermostatic spring 47 outwardly. This permits convenient control of the action of the thermostatic spring 47 and has proven very satisfactory in adjusting and controlling the length of time required to increase the tension of the thermostatic element 47 to a point where the latch pin 75 will be pulled off from engagement with the latch spring 53.

The invention is susceptible of many other modifications and the various features thereof may be utilized in a variety of other arrangements. It is accordingly desired that the appended claims be given a broad construction commensurate with the scope of the invention.

I claim:

- 35 1. In a device of the class described, a base member, a removable plug supported on said base member, an electrical heating coil on said plug, means on said base member for moving said plug to an energizing position in which said coil is energized, means tending to withdraw said plug from said energizing position, and a thermostatic element responsive to the heating of said coil for controlling the action of said withdrawing means.
- 45 2. In a device of the class described, a removable heating member having an electrical heating unit, a socket for receiving and holding said heating member, electrical current supply terminals, means for moving said heating member to a position for establishing an energizing circuit to said heating unit, and means responsive to the temperature of said heating unit for interrupting said energizing circuit.
- 55 3. In a lighting device for cigars and the like, a removable heating member having an electric heater, a support for receiving and holding said heating member, current supply terminals on said support, said heating member being movable on said support to a position where said heating unit is energized from said terminals and means responsive to the temperature of said heating unit for controlling the heating thereof.
- 65 4. In an electrical lighter of the class de-

scribed, a plug having an electrical heater, a socket for receiving said member and holding the same, a base for said socket, current supply terminals on said base, said socket being mounted on said base for movement to a position for establishing an energizing connection from said terminals to said heater, and means responsive to the heating of said heater for interrupting the current supply connections thereto.

5. In an electric lighting device of the class described, a removable heating member having an electrical heater, a base, a movable socket on said base for receiving said heating member, current supply terminals on said base, and a bi-metallic thermostat for controlling movement of said socket to vary the energization of said heater on said base.

6. In an electric lighter of the class described, a lighting member having an electrical heater, a socket for receiving and holding said heater, current supply terminals on said base, means for moving said socket and the heater supported thereby to position where it is energized from said current supply terminals, means tending to withdraw said socket from the energizing position, a latching means for locking said socket in the energized position, and a bi-metallic strip controlling said latching means to cause withdrawal of said heating member from the energizing position.

7. In a lighter of the class described, a base, a socket member movably mounted on said base, a heating plug adapted to be inserted and held in said socket, an electric heating coil on said plug, said socket being movable on said base member between an energizing and a de-energizing position.

8. In an electric lighter of the class described, a base member, a socket rotatably mounted on said base member, a heating plug adapted to be inserted into said socket, an electrical heater on said plug, electrical supply terminals on said base member, said socket being rotatable between an energized position where circuit is established from said terminals to said heater and an off position where said circuit is interrupted, means tending to hold said socket in the off position, locking means for locking said socket and the associated plug in the energizing position and thermostatic means for releasing said locking means.

9. In an electric lighter of the class described, a base member, a socket rotatably mounted on said base member, a heating plug adapted to be inserted into said socket, an electrical heater on said plug, electrical supply terminals on said base member, said socket being rotatable between an energized position where circuit is established from said terminals to said heater and an off position where said circuit is interrupted, means tending to hold said socket in the off posi-

tion, locking means for locking said socket and the associated plug in the energizing position and a bi-metallic element responsive to the heating of said heater for releasing said locking means.

10. In a lighter of the class described, a base member, a tubular socket rotatably mounted on said base member, a heating plug adapted to be inserted into said socket and rotated therewith, a heater on said plug, said plug having a shell fitting and engaging such socket; a latching pin on said plug insulated for said shell, said heating element being connected between said pin and said shell, latching means mounted on said base for engagement with said pin, an electric terminal connection to said socket, an electric terminal connection to said latching means, means tending to move said socket to an unlatched position and a thermostatic element for releasing said latching means in response to the heating of said heater to cause de-energization of said heating coil after being brought to temperature in the energizing position.

11. In an electric lighter of the class described, a base member, a heater member movably mounted on said base member, an electric heater on said heater member, electrical supply terminals on said base member, said heater member being movable between an energized position where a circuit is established from said terminals to said heater, and an off position where said circuit is interrupted, and automatic means for withdrawing said heater member from the on position to the off position upon heating of said heater.

12. In an electric heater of the class described, a movable heating member having an electrical heating unit, a socket for holding said heater member, electrical current supply terminals, means for moving said heating member to a position for establishing an energizing circuit to said heating unit, and automatic means for withdrawing said heating unit from said energizing position upon predetermined heating of said heating unit.

13. In an electric lighter of the class described, a base member, a socket rotatably mounted on said base member, a heating plug adapted to be inserted in said socket, an electrical heater on said plug, said socket being rotatable between an energized position where a circuit is established from said terminals to said heater, and an off position where said circuit is interrupted, locking means for locking said socket in the energized position, thermostatic means for releasing said locking means, and a spring screened against the action of said heater arranged to withdraw said socket to the off position.

14. In an electric heater of the class described, a base, a socket movably mounted on said base, a heating plug adapted to be inserted into said socket, a heating unit on the inner end of said plug adapted to be housed in said socket, electrical supply terminals, said socket being movable between an energized position where a circuit is established from said terminals and an off position where said circuit is interrupted, and a spring disposed outside of said socket tending to move the same to a de-energized position.

15. In an electric heater of the class described, a base, a socket movably mounted on said base, a heating plug adapted to be inserted into said socket, a heating unit on the inner end of said plug adapted to be housed in said socket, electrical supply terminals, said socket being movable between an energized position where a circuit is established from said terminals and an off position where said circuit is interrupted, a spring disposed outside of said socket tending to move the same to a de-energized position, and automatic means holding said plug in an energized position until predetermined heating thereof.

In testimony whereof I have hereunto subscribed my name.

HERBERT E. MEAD. 93

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Dec. 13, 1938.

J. H. COHEN

2,140,311

CIGAR LIGHTER

Original Filed July 23, 1932 2 Sheets-Sheet 1

Fig. 1

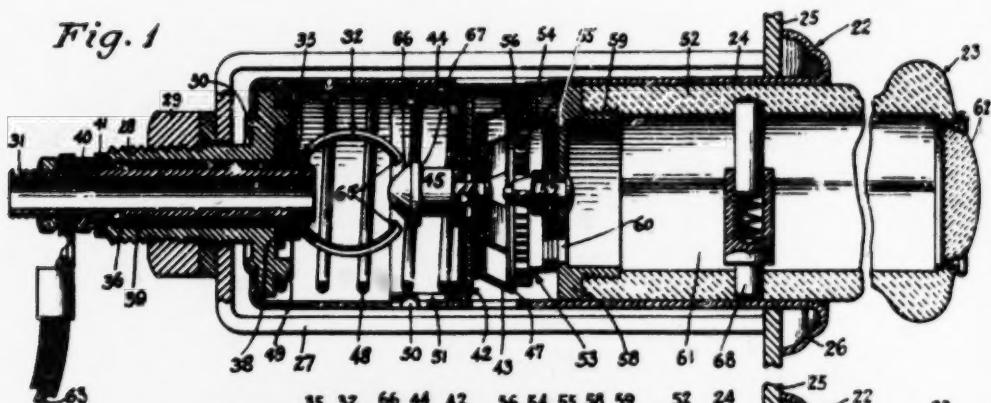


Fig. 2

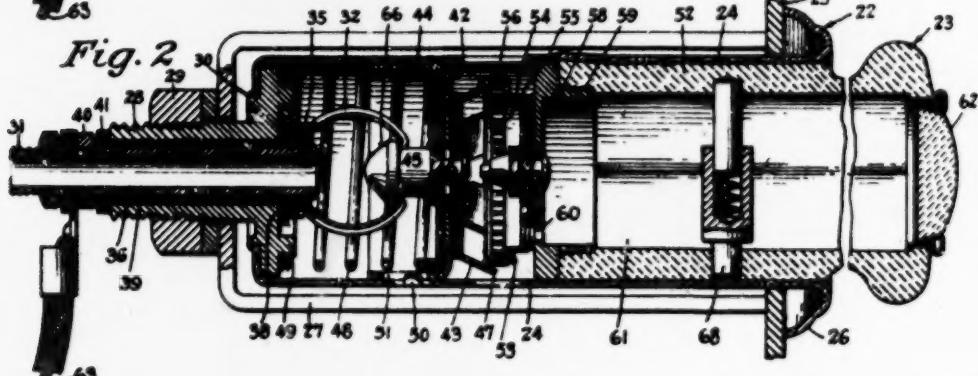


Fig. 3

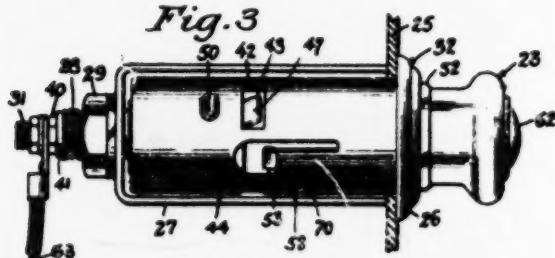


Fig. 4

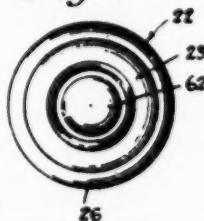


Fig. 5



Fig. 6



Fig. 7

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CIGAR LIGHTER

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Fig. 8

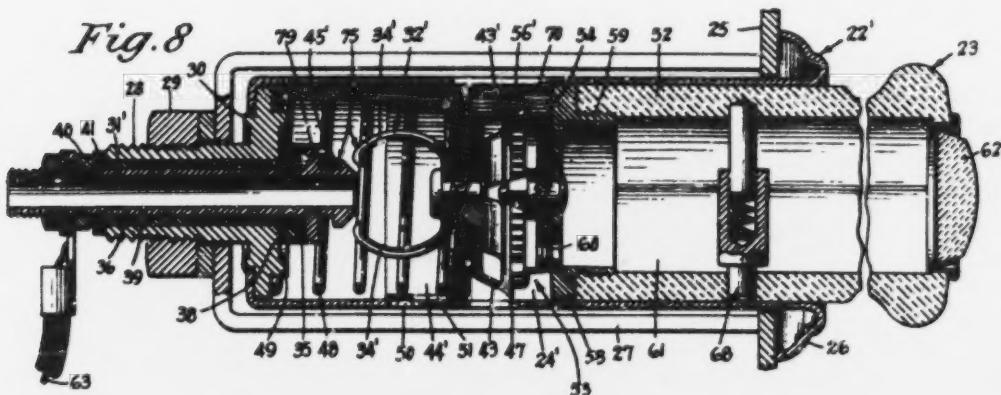


Fig. 9

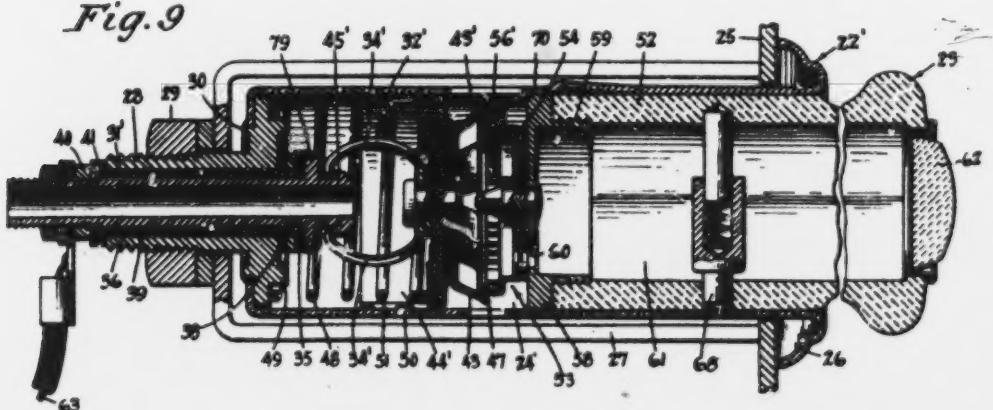


Fig. 10

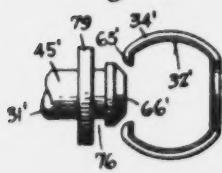


Fig. 11

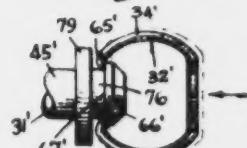


Fig. 12

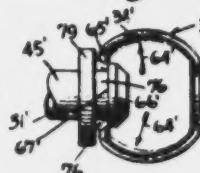


Fig. 13

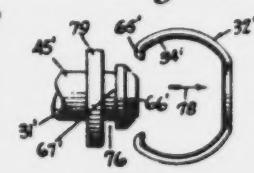


Fig. 15

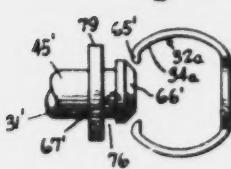


Fig. 16

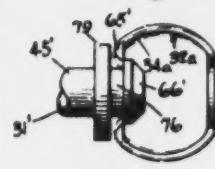
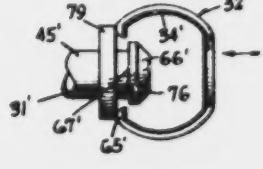


Fig. 14



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UNITED STATES PATENT OFFICE

2,140,311

CIGAR LIGHTER

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Original application July 23, 1932, Serial No.
624,193, now Patent No. 2,117,703, dated May
17, 1938. Divided and this application Janu-
ary 2, 1937, Serial No. 118,838

27 Claims. (Cl. 219—32)

This invention relates to electric cigar lighters, and more particularly to the type in which an igniting unit is completely removable from a holding device for use. Such cigar lighters are particularly desirable for use on motor vehicles.

An object of this invention is to provide an improved cigar lighter of the type referred to in which the current-supply circuit for the heating element of the igniting unit, after being closed as the result of manual engagement of a portion of the igniting unit which is accessible while the latter is supported on the holding device, is automatically maintained closed until the heating element is heated for use.

Heretofore it was proposed to do this by providing parts of the automatic control for the circuit, some on the holding device and some on the igniting unit, with the result that these separable parts had to be made to match each other in each particular cigar lighter for best results, and hence the igniting units and the holding devices, respectively, were not interchangeable with other like igniting units and holding devices.

According to the present invention, this difficulty is obviated by so arranging the means for automatically controlling the circuit supplying current to the heating element and restoring the circuit to normal open-circuit position, that they are carried entirely by solely one and the same of the two separable parts of the cigar lighter. With this new arrangement of such means, they remain in predetermined operative relation relative to each other in a single operative structure irrespective of the interchange of said igniting unit or holding device with other like igniting units or holding devices, which is of great advantage in the manufacturing, installation and servicing of such cigar lighters.

Another feature of this invention is the provision of an improved circuit-controlling means for the cigar lighter comprising relatively movable members manually caused to be moved to close the circuit, detent means for holding the members in closed-circuit position, yielding means to restore them to open-circuit position, and heat-responsive means for controlling the return of the members to open-circuit position.

Preferably, though not always essentially, the heat-responsive means is in heat-receiving relation with the heating element and may advantageously be bimetallic and carry the detent means as well as surfaces contacting with surfaces on one of the relatively movable members to conduct current to the heating element. Also, the heating element, the relatively movable mem-

bers, the detent means, the heat-responsive means, and the means for urging the members to open-circuit position, either all or some of these, preferably, though not always essentially, may be arranged in the part of the cigar lighter carrying them so as to be coaxial with each other. This construction makes for easy assembly of the parts and close nesting so that they may be contained safely conveniently within the part of the cigar lighter carrying them.

Another feature of this invention is the provision of means whereby the circuit through the heating element may be maintained closed by manual effort, even though the heat-responsive means has acted to open the circuit, so that the heating element may be reheated for a repeated use, without waiting for the heat-responsive element to cool sufficiently to itself close the circuit.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a longitudinal sectional view of the cigar lighter of the present invention in normal inoperative position.

Fig. 2 is a view similar to Fig. 1, but with the cigar lighter in closed or operative position.

Fig. 3 is a plan view of the cigar lighter.

Fig. 4 is a front view.

Fig. 5 is a detail view showing the thermostatic catch of the present invention in the inoperative position.

Fig. 6 is a detail, similar to Fig. 5, but shows the catch in the operative position.

Fig. 7 is a view similar to Figs. 5 and 6, but shows the catch in its fully released condition.

Fig. 8 is a longitudinal sectional view, similar to Fig. 1, but with a modified form of catch and circuit closer, in the normal inoperative position.

Fig. 9 is a view similar to Fig. 8, but shows the parts in the operative position.

Fig. 10 is a detail view of the circuit closer and thermostatic catch of this form of the invention in the open inoperative position, similar to Fig. 8.

Fig. 11 is a detail view, similar to Fig. 10, but shows the catch in closed-circuit position.

Fig. 12 is a detail view, similar to Fig. 11, but shows the catch in its partially released position.

Fig. 13 shows the catch and circuit-closing parts returned to the open inoperative position.

Fig. 14 is a view similar to Fig. 13 of the invention showing the catch used to effect an auxiliary closing of the circuit even though the catch is thermostatically maintained in an open position.

Fig. 15 is a view similar to Fig. 10, but shows the catch and circuit closer parts made of regular material, rather than bimetallic material.

Fig. 16 is a detail view, similar to Fig. 15, in the closed-circuit position and about to be released.

This is a division of my application Serial No. 624,193, filed July 23, 1932, now Patent No. 2,117,703, issued May 17, 1938.

For convenience and clarity in the following description, the present invention is shown as applied to what may be termed "sleeve-type" cigar lighters for use with automobiles, similar to the lighter disclosed in my Patent No. 1,944,925, issued January 5, 1934, but it should be understood that it may also be used with other types of cigar lighters. Broadly, the cigar lighter comprises a holding device or base member 22 and a removable igniting unit 23 which may be mechanically and electrically separated from the base member for use.

The base member 22 comprises a socket 24 adapted to be passed through a suitable aperture in an instrument panel 25 of an automobile, or other convenient location, until a flange 26 at the front end thereof engages with the front face of the panel. The socket is rigidly secured in place with a U-shaped yoke 27 fitted over an outer sleeve 28 and a clamping nut 29. The outer sleeve is preferably rigidly secured to the socket 24 by a spun-over flange 30.

A contact-carrying sleeve 31 is insulatedly mounted in the outer sleeve 28, and at its forward end there is secured a main contact 32 having a main body portion 33 shaped similar to a washer and one or more integral hook-shaped fingers 34 extending therefrom. The contact carrier sleeve is secured in place by passing a washer 35 and tube 36 of insulation over the contact sleeve 31, passing an insulating washer 38 over the insulating sleeve 36, and then passing the entire assembly through a bore 39 of the outer sleeve 28, where it is rigidly secured to the latter part with the nut 40 and insulating washer 41. These various parts of insulation just described prevent electrical connection between the contact sleeve 31 and outer sleeve 28 and are preferably made of mica in order to be heat resisting.

The base member is completed with a relatively movable member or slide 42 which carries an intermediate contact 43. This slide comprises a cup or sleeve 44 which has a free fit within the socket 24. Near its center the cup is provided with a contact and catch stud 45 which is insulated from the cup by suitable insulating washers. It is held in place by spinning or otherwise heading-over the end of the shank 46, and when this is done a contact washer with yielding fingers 47 forming the intermediate contact 43 is secured to the cup so that current may be passed from the contact 45 to the fingers. The cup also serves to hold a spring 48 in the socket 24, free from the side walls at one end, while the other end of the spring is located in the socket by a shoulder portion 49 of the outer sleeve 28. Longitudinal movement of the slide 42 is limited in two directions by a lanced finger 50 part of the socket 24 being bent into and engaging the ends of a slot 51 in the cup.

The removable igniting unit 23 comprises a body 52 preferably made of Bakelite or some similar insulating material of a size to slide freely in the socket 24. At one end it supports a heater unit 53 comprising a spirally wound heating coil 54 in a cup 55. One end of the heating coil is connected electrically to the outer wall of the

shell by means of a ring 56 which is spun thereover and the other end of the coil is connected to a stud 57 at a slot in the latter. This stud passes through a suitable hole in the shell 55 and is insulated from the latter with suitable insulating washers. It is mechanically and electrically secured to a ring 58 which has a threaded connection 59 with the igniting unit body. The heater unit 53 is provided with a series of holes 60 which allow the incandescent glow of the heating coil to pass through a bore 61 of the body 52 to the front end of the igniting unit 23 where they are magnified and projected by means of a ruby glass 62, or by a disk of Catalin or similar light-conducting material.

The wiring circuit for the cigar lighter comprises a ground connection through the instrument panel 25, flange 26 and the yoke 27 extending one side of the car battery circuit to the socket 24 portion of the base 22 and the other pole of the circuit comprises a wire 63 from the battery connected to the contact sleeve 31 and rigidly secured thereto with a nut.

Now, of particular importance, the cigar lighter is, according to the present invention, arranged to prevent an excessive drain on the battery, and to lessen the amount of attention required from the driver. To this end, there is provided a novel catch for holding the igniting unit in energizing position and a novel circuit closer switching arrangement for automatically controlling the circuit between the movable contact stud 45 and the stationary main contact 32.

This special catch and thermostatically controlled switch is, according to the present invention, made as a unitary structure; that is, both are embodied together and it is thereby possible to effect a marked economy in the cost of manufacture, because fewer parts are required and a single assembly and adjustment takes care of both the catch and the thermostatically controlled switch. In its present preferred form this combined catch and thermostatically controlled switch comprises the main contact 32, made of bimetallic material in order to be responsive to thermal conditions of the latter. The fingers thereon are of narrow width and slightly bowed so that there is a marked tendency for these fingers to spread or to open up in the direction of the arrows 64 in Fig. 7 to the solid line position 65 shown in the latter figure under the influence of heat.

These fingers are provided with hooks 66 at their outer ends which are adapted to engage with a bevel 67 on the front end of the main contact stud 45 and be forced apart thereby and then snapped in back of a shoulder 68 portion of the stud when the sliding sleeve is pushed toward the bottom of the socket into position shown in Fig. 2.

The contact finger hooks 66 thus positively lock the sliding sleeve 44 in the closed position and at the same time complete an electrical connection from the main contact sleeve 31, contact 32, and the stud 45 to the intermediate contact disk 43 and also through the ring 56 and stud 57 of the removable igniting unit 23 to complete the circuit to the heating coil 54 to energize the coil and bring it to incandescence.

As the heating coil 54 is brought to incandescence some of the heat is radiated from the front face of the coil against the inside of the disk 43 and follows through the ring and contact figures 67. As the fingers are heated in this manner some of the heat follows through to the stud 57

65 and fixed contact fingers 34, and at the same time heats the air within the chamber formed by the socket 24 and shell 44, to cause the contact fingers to expand gradually in the direction of the arrows 64 (see Fig. 7) until the hooks 65 move clear or free of the shoulder 67 whereupon the spring 48 is free to again move the sliding sleeve 44 forwardly in the socket 24 until the movement is stopped by the lanced ear 58 engaging an end of the slot 51 as shown in Fig. 1. At the same time it pushes the removable igniting unit 23 forwardly in the socket and moves the contact 45 of the switch into open circuit or deenergizing position shown in Figs. 1, 5 and 7.

As will be seen from Figs. 1 and 2 of the drawings, all of the elements of the switching means are carried entirely by one and the same part of the cigar lighter, herein illustrated as the holding device or base member, in coaxial alignment with one another and with the heating element. This enables the switch unit to be readily assembled within one of the parts of the cigar lighter.

It should also be noted that the particular form of switching unit and contacts provided therefor by the present invention have the very desirable advantage of making it unnecessary for the operator to twist, push, or in any special manner rotatably align the removable igniting unit 23 relative to the base 22 when returning the unit to the inoperative position on the base, or to do any involved twisting or aligning when it is desired to move the removable igniting unit into the operative or energizing position. It is merely necessary to put the plug 23 into the socket 24 when placing one within the other and merely necessary to push against the end of the igniting unit in order to move it to energizing position.

Normally the igniting unit 23 is in the position shown in Fig. 1 for the driver or other occupant of the car, after using the unit, merely slides it into the socket 24 until the cup 55 and ring 56 thereon engages with the spring contact fingers 41 of the slide 42. The pressure of the spring 48 on the sliding member serves as a stop or indication that the unit has been slid fully into the inoperative position. A spring plunger 68 is located in the plug body 62 to impinge against the bore of the socket 24 and prevent the igniting unit 23 from working out of the socket even though the car vibrates badly.

When it is desired to use the cigar lighter the driver merely grasps the knob which is an accessible portion of the igniter unit body 62 and pushes it and the movable contact-carrying member deeper into the socket against the pressure of the yielding spring 48 whereby the bevelled end 66 of the contact 45, as the contact-carrying member slides in the socket 24, engages with the hooks 65 to spread the fingers 34 until the hooks snap over the shoulder 67 as shown in Fig. 6, to lock the sliding unit in the back and switch closing position. Preferably a long finger 70 is lanced inwardly of the socket 24 with a raised portion adapted to engage and complete electrical connection between the socket 24 and igniting unit if the bore of the socket becomes worn considerably. The operator may then release his grip on the igniting unit and again use both hands for driving while the coil 34 is being heated tact-carrying element for holding the contacts in engagement; heat-responsive means for releasing the detent means to open the circuit; and

the shoulder portion 67 of the stud 45 until a release between the shoulder and hooks is effected and the igniting unit moved back into the inoperative position shown in Fig. 1 under the influence of the sliding sleeve 44 and spring 48. Thereafter, the driver pulls the lighter from the socket for use.

The light disk 62 as the outer end of the igniting unit 23 serves to transmit an incandescent glow from the heater coil and warn the operator that the lighter is in condition for use.

In Figs. 8 to 13 inclusive, there is shown a modified form of the present invention. The removable igniting unit 23 in this form of lighter is exactly the same as that shown in the first form 15 of the invention. The holding device or base member 22', however, while like the base member 22 of the preferred form of the invention in many respects is provided with a different form of catch and switch unit 75 comprising a contact 20 stud 45' made integral with a contact sleeve 31' and a sliding sleeve 44' is arranged to support and carry a yielding bimetallic contact member 32' with bowed fingers 34' and hooks 65'.

The fingers 34' and hooks 65' are normally in 25 the closed position shown in Fig. 8, and are adapted to ride over a bevel 66' on the end of the contact sleeve 31' and hook into a groove 76 in back of the shoulder 67', as shown in Figs. 9 and 11. With this form of the present invention, 30 as with the preferred form, it is merely necessary for the operator to push the igniting unit 23 longitudinally into the bore of a socket 24' portion of the base 22' until the hooks snap into the groove 76 whereupon current is conducted to 35 the outer end of the heater coil 54 through the stud 77, contact fingers 45', and ring 56', the circuit being completed by the closed line between the panel 25, shell 24', ring 56, and stud 57 to the inner end of the coil.

When the switch 75 is closed and as the heater coil is brought to incandescence the spring contact fingers 34' and hooks 65' gradually open from the position shown in Fig. 11 in the direction of the arrow 64' and into the position shown 45 in Fig. 12 until the hooks are free of the shoulder 67' portion of the groove 76, whereupon the sliding unit and hook carried thereby, under the influence of the spring 48, travel in the direction of the arrow 78 shown in Fig. 13 to move the 50 igniting unit again into the inoperative position shown in Fig. 8.

This modified form of the present invention has the advantage of making it possible for the operator to manually manipulate the lighter to 55 obtain a further degree of incandescence without waiting for the main contacts 32' to cool and resume their normal closed position, and to this end there is provided an auxiliary contact or flange 79 which contacts with the ends of the 60 hook 65' when the igniter is pushed the full extent toward the back of the base member as shown in Fig. 14.

In Figs. 15 and 16 there is shown a further modified form of the present invention comprising 65 a yielding contact member 32a, having fingers 34a similar to and arranged to ride over the bevel 66' and snap into grooves 76 in much the same manner as the contact member 32', shown in Figs. 10 and 11, or the contact members 70 device with other like igniting units or holding devices.

15. A cigar lighter having two parts one con- 75

economy and it may be more advantageous than the bimetallic form in lighters which are brought to incandescence only slowly, or if the cigar lighter construction is such that there is a quick flow of heat from the heater coil to the yielding contact member; in other words, where it is desired to have a slowly responsive device.

Other variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new and for which it is desired to obtain Letters Patent, is:—

15. 1. In an electric cigar lighter, the combination of a base member; a unit removably supported by the base member; a heating coil on said unit; a circuit for said coil; a slide in said base member, and with the aforesaid unit, movable into operative and inoperative positions thereon; a shouldered stud and a hooked arm on said base and slide members respectively adapted to hold the slide and movable unit in the operative position and to close the circuit to the heating coil, said arm being adapted to move into an open and circuit-breaking position relative to the shouldered stud in response to the increase in temperature of the heating coil; and means for conducting current from the hooked arm to the heating coil when it is in the thermally opened condition and the movable unit is manually moved to operative position.
20. 2. In an electric cigar lighter, the combination of a base member; a unit removably supported by the base member; a heating coil on said unit; a circuit for said coil; a slide in said base member, and with the aforesaid unit, movable into operative and inoperative positions thereon; a detent adapted to hold said slide in the operative position and to close the circuit to the heating coil, until the coil has been heated a predetermined extent whereupon it opens and allows return of the slide to inoperative position and opens the circuit; and means for effecting an auxiliary closing of the circuit through said detent while it is in its thermally open condition and the movable unit is manually maintained in operative position.
25. 3. In an electric cigar lighter, the combination of a base member; a socket on the base member; a plug removably mounted in the socket and longitudinally movable in said socket to a shallow inoperative position and into a deep operative position; a heating coil on said removable plug; means adapted to move the removable plug in the socket from the deep operative position to the shallow inoperative position preparatory to removal and use; and thermal responsive means in axial alignment with the plug for restraining said last-named means until the heating coil reaches a predetermined temperature.
30. 4. In an electric cigar lighter, the combination of a base member; a unit removably supported by the base member, and movable thereon into an operative and into an inoperative position; a heating coil on said unit; a circuit for said coil; a cooperating shouldered stud and hooked arm responsive to the temperature of the heating coil in said circuit, said arm being adapted to move into an open and circuit-breaking position relative to the shouldered stud in response to the increase in temperature of the heating coil; and means for conducting current from the hooked arm to the heating coil when said arm is in the thermally opened condition and the mov-

able unit is manually maintained in operative position.

5. In a cigar lighter of the removable type, holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to solely bodily movement of the igniting unit and heating element toward the holder to close a current supply circuit including the heating element to heat the latter for use; means, including means responsive to the temperature of the heating element, for moving the igniting unit outwardly of the holder and partially ejecting the same when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element; and means for maintaining the igniting unit on the holder in partially ejected position against casual removal, the means last-mentioned including a spring-loaded plunger carried by and extending across the igniting unit.

6. In a cigar lighter of the removable type, holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to solely bodily movement of the igniting unit and heating element toward the holder to close a current supply circuit including the heating element to heat the latter for use; a spring actuated ejector placed under tension when the igniting unit is moved to circuit-closing position for moving the igniting unit outwardly of the holder; and means responsive to the temperature of the heating element and in axial alignment with the same for restraining said ejector and releasing the same when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element.

7. In a cigar lighter of the removable type, holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to solely bodily movement of the igniting unit and heating element toward the holder to close a current supply circuit including the heating element to heat the latter for use; and means, including means responsive to the temperature of the heating element and a spring actuated ejector, for moving the igniting unit outwardly of the holder when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element, said ejector being placed under tension when the igniting unit is moved to circuit-closing position, and having a locking member engaged by the temperature responsive means to be restrained by the latter until the heating element attains said predetermined temperature, said locking member and temperature responsive means being metallic and constituting part of the current supply circuit to the heating element and electrically disengaging each other at said predetermined temperature to open the circuit to the heating element.

8. In a cigar lighter of the removable type, a holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to solely bodily movement of the igniting unit and heating element toward the holder to close a current supply circuit including the heating element to heat the latter for use; and means, including means responsive to the temperature of the heating element and a spring actuated ejector, for moving the igniting unit outwardly of the holder when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element.

heating element, said ejector being placed under tension when the igniting unit is moved to circuit-closing position and having a locking member engaged by the temperature responsive means to be restrained by the latter until the heating element attains said predetermined temperature, said locking member and temperature responsive means being metallic and constituting part of the current supply circuit to the heating element and electrically disengaging each other at said predetermined temperature to open the circuit to the heating element, said locking member and temperature responsive means being shaped to be again electrically engaged without mechanically interlocking while the temperature responsive means is still in releasing position.

9. In a cigar lighter of the removable type, a holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to solely bodily movement of the igniting unit and heating element toward the holder to close a current supply circuit, including the heating element to heat the latter for use; means, including means responsive to the temperature of the heating element, for moving the igniting unit outwardly of the holder when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element, said temperature responsive means being metallic and constituting a part of the current supply circuit and being movable to open the circuit when the heating element attains said predetermined heat; and means for electrically engaging said temperature responsive means when in circuit-opening position to again close the circuit whereby the temperature of the heating element may be raised above said predetermined temperature.

10. In a cigar lighter of the removable type, a holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to solely bodily movement of the igniting unit and heating element toward the holder to close a current supply circuit, including the heating element to heat the latter for use; means, including means responsive to the temperature of the heating element, for moving the igniting unit outwardly of the holder when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element, said temperature responsive means being metallic and constituting a part of the current supply circuit and being movable to open the circuit when the heating element attains said predetermined heat; and means operative by movement of the igniting unit relative to the holder when the temperature responsive means is in circuit-opening position, to again close said circuit whereby the temperature of the heating element may be raised above said predetermined temperature.

11. In a cigar lighter, a holder; an igniting unit mounted on the holder and removable therefrom for use; a contact-carrying element mounted in the holder for sliding movement between limits; a contact on the holder; a contact on the contact-carrying element adapted to be moved into engagement with the contact on the holder by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holder to close an electrical circuit; detent means engaging said contact-carrying element for holding the contacts in engagement; heat-responsive means for releasing the detent means to open the circuit; and

means for normally urging the contact carried by the contact-carrying element into open-circuit position.

12. A replaceable heating element for the rear end of an igniting unit comprising a coil of resistance wire; a cup-shaped contact member around said coil into which the outer end of the coil is secured; another cup-shaped member axially but oppositely secured to the first with a layer of insulating material between their adjacent bases; means for clamping the cup-shaped members together, the inner end of said resistance wire being secured to said clamping means; screw threads fixedly secured on the outer surface of said second-mentioned cup-shaped member for cooperation with threads on the inside of the rear end of an igniting unit; and a peripheral electrical contact flange integral with the second-mentioned cup-shaped member substantially aligned with the base portion thereof and extending radially outwardly beyond the sides of both cup-shaped members.

13. An igniting unit for a cigar lighter comprising a hollow body portion of insulating material; a heating element on the rear end of said body and including a coil of resistance wire; a cup-shaped contact member around said coil and to which the outer end of the coil is secured; another cup-shaped member axially but oppositely secured to the first with a layer of insulating material between their bases; means clamping said cup-shaped members together, the inner end of said resistance wire being secured to said clamping means, the outer surface of the walls of said second-mentioned cup-shaped member being provided with screw threads which are fixedly secured thereto engaging cooperating screw threads on the inside of the rear end of said insulating body; and a peripheral electrical contact flange integral with the second-mentioned cup-shaped member substantially aligned with the base portion thereof extending radially outward beyond the sides of both cup-shaped members and contiguous with the rear end of the body, a friction device in front of the peripheral flange biased to a position radially outside of the body for cooperation with the inner surface of a holding device.

14. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removable from the holding device for use and having a heating element thereon, a pair of relatively movable members; means for normally urging the members apart; means carried by each of said members and cooperating to close a circuit through the heating element when moved into engagement with one another when said members are moved toward one another by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device; and heat-responsive means for holding the movable members in closed-circuit position until the heating element has attained its desired usable heat, said members, the circuit-closing means carried thereby, the urging means, and the heat-responsive means being entirely carried by solely one and the same of the said two parts of the cigar lighter, so as to remain in predetermined operative relation relative to each other in a single operative assembly irrespective of the interchange of said igniting unit or holding device with other like igniting units or holding devices.

15. A cigar lighter having two parts one com-

stituting a holding device and the other constituting an igniting unit removably supported by the holding device and having a heating element thereon, one of said parts having a pair of relatively movable members; means for normally urging the members apart; cooperating circuit-closing means mutually carried by the members; manually operable means for moving said members toward one another into position to close 5 a circuit through the heating element, said circuit-closing means including heat-responsive means in heat-receiving relation with the heating element for opening the circuit when the heating element has attained its desired usable heat; and auxiliary contact means to close said 10 circuit when the heat-responsive means is in open-circuit position and said parts are held together manually.

16. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit longitudinally slidable in the holder and removable therefrom for use, 15 said igniting unit having a heating element thereon, a pair of longitudinally movable elements for closing a circuit through the heating element; means for normally urging the elements into an open-circuit position; means for longitudinally moving one of the elements with respect to the other against said urging means and 20 into closed-circuit position by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device; and heat-responsive latch means for maintaining the elements in closed-circuit position against the action of the urging means until the heating element has attained its desired heat, said movable elements, urging means, and heat-responsive latch being entirely carried by solely one and the same of the said two 25 parts of the cigar lighter, so as to remain in predetermined operative relation relative to each other in a single operative assembly irrespective of the interchange of said igniting unit or holding device with other like igniting units or holding devices.

17. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removably supported by the holding device and having a heating element thereon, one of said parts having a shouldered stud contact and a hook contact thereon relatively movable with respect to the shouldered stud and into engagement therewith to close an energizing circuit through the heating element; 30 and manually operable means for moving the contacts into closed-circuit position, the hook contact being heat-responsive and in heat-receiving relation with the heating element and adapted to hold the circuit closed until the heating element has attained its desired heat.

18. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removably supported by the holding device and having a heating element thereon, one of said parts having a pair of relatively movable members, one of said members carrying a shouldered stud contact and the other a cooperable heat-responsive latch contact in longitudinal alignment with the shouldered stud contact; and means for moving by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device one of said members longitudinally of the part for causing the contacts to become engaged and close a circuit through 35 the heating element, the heat-responsive latch being disposed behind the shoulders of the members for holding the movable members in circuit-closing position until the heating element has attained the desired usable heat.

19. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removably supported by the holding device and having a heating element thereon, one of said parts having a pair of relatively movable members, one of said members carrying a shouldered stud contact and the other a cooperable heat-responsive latch contact means operated by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device for moving one of said members longitudinally of the part for causing the contact to become engaged and close a circuit through the heating element, the heat-responsive latch engaging the shoulders of the stud and holding the members in circuit-closing position until the heating element attains the desired heat and the releases the stud contact and opens the circuit and auxiliary means to again close the circuit through the heating element upon said members being manually held in closed-circuit position while the heat-responsive latch is in thermally open-circuit position.

20. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removably supported by the holding device and having a heating element thereon, one of said parts having a pair of coaxially disposed relatively movable members; means carried by each of the members and operating to close a circuit through the heating element when moved relative to one another to a closed-circuit position; means normally urging the members into open-circuit position; and heat-responsive means in heat-receiving relation with said heating element, coaxial with the heating element and coaxial with the movable members, said heat-responsive means holding the movable members in circuit-closing position until the heating element has attained its desired usable heat.

21. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removably supported by the holding device and having a heating element thereon, one of said parts having a pair of relatively movable members, one of said members carrying a stud contact and the other a cooperable contact for claspingly engaging the stud contact and closing a circuit through the heating element when the contacts are moved into engagement with one another, the last-named contact being bimetallic and in heat-receiving relation with the heating element and moving to release the stud contact and open the circuit upon the heating element attaining the desired usable heat.

22. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removably supported by the holding device and having a heating element thereon, one of said parts having a pair of relatively movable members; means for normally urging the members apart; means including a shouldered contact on one of the members and a cooperating contact comprising yieldable jaws to grip the shouldered contact and engage the shoulder thereof on the other member cooperable to close a circuit through the heating element

then moved into engagement with one another when said members are moved toward one another by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device, said jaws being heat-responsive and disengaging and releasing said shouldered contact upon being heated to a predetermined heat.

23. A cigar lighter having two parts, one constituting a holding device and the other an igniting unit supported by the holding device but removable therefrom for use, said igniting unit having a heating element thereon and being adapted for use with said holding device or another like holding device, a switch including a pair of contacts, one being relatively movable with respect to the other to close a circuit through the heating element; means for normally urging the contacts into open-circuit position; means for moving the contacts into closed-circuit position by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device; detent means for maintaining the circuit closed against the action of the urging means; and heat-responsive means for releasing the contacts to the action of the urging means upon the heating element attaining its desired heat, said switch, detent means, urging means, and heat-responsive means being entirely carried by solely one and the same of said parts of the cigar lighter, so as to remain in predetermined operative relation relative to each other in a single operative assembly irrespective of the interchange of said igniting unit or holding device with other like igniting units or holding devices.

24. A cigar lighter having two completely separable parts, one being a holder and the other an igniting unit supported by the holder but removable therefrom for use and carrying a heating element; means for feeding energizing current to the heating element including cooperating contacts on the holder and igniting unit; a switch having relatively movable contacts, manually operated means for closing said switch; and thermostatically controlled means associated with said switch and in heat-receiving relation with the heating element for causing the switch to be opened when the heating element is ready for use and to remain open until the next operation of said manually operated means, said switch and thermostatically controlled means being entirely carried by solely one and the same of the said two parts of the cigar lighter, so as to remain in predetermined operative relation relative to each other in a single operative assembly irrespective of the interchange of said igniting unit or holding device with other like igniting units or holding devices.

25. A cigar lighter having two parts, one of said parts being a holding device and the other of said parts being an igniting unit supported by the holding device but removable therefrom for use, said igniting unit having a heating element thereon; cooperating contacts on the holding device

and the igniting unit to normally establish circuit connections between the said two parts; and a switch for closing an energizing circuit including said contacts and heating element, said switch being movable to closed-circuit position by 5 manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device, thermostatically controlled and automatically restored to open-circuit position when the heating element 10 has been heated for use, said switch being entirely carried by solely one and the same of the said two parts of the cigar lighter, so that all component parts of the switch remain in predetermined operative relation to each other in a 15 single operative assembly irrespective of the interchange of said igniting unit or holding device with other like igniting units or holding devices.

26. A cigar lighter having two parts one constituting a holding device and the other constituting an igniting unit removably mounted on the holding device for use and having a heating element thereon, one of said parts having a pair of coaxially disposed relatively movable members; means carried by each of the members and 25 cooperating to close a circuit through the heating element when moved relative to one another to a closed-circuit position by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported 30 on the holding device; means normally urging the members into open-circuit position; means for holding the movable members against said urging means when moved into closed-circuit position; and heat-responsive means coaxial with 35 the movable members for releasing the holding means upon the heating element attaining a desired usable heat whereby the urging means moves the members into open-circuit position and maintains the circuit open until it is again 40 manually closed.

27. A cigar lighter having two parts, one constituting a holding device and the other an igniting unit supported by the holding device but removable therefrom for use said igniting unit having a heating element thereon and being adapted for use with said holding device or another like holding device, a switch including a pair of contacts, one being relatively movable with respect to the other to close a circuit through the heating element; means for normally urging the contacts into open-circuit position; means for moving the contacts into closed-circuit position by manual engagement of a portion of the igniting unit which is accessible while the igniting unit is supported on the holding device; detent means for maintaining the circuit closed against the action of the urging means; and heat-responsive means for releasing the contacts to the action of the urging means upon the heating element attaining its desired heat, said switch, detent means, urging means, and heat-responsive means being carried entirely and solely by the holding device.

JOSEPH H. COHEN.

65

CERTIFICATE OF CORRECTION.

Patent No. 2,140,311.

December 13, 1938.

JOSEPH H. COHEN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 57, claim 7, for "emperature" read temperature; page 1, first column, line 8, claim 22, for the word "heating" read heated; line 31, claim 23, before "parts" insert two; and that the said Letters Patent should be read with this correction wherein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of February, A.D. 1939.

Henry Van Arsdale.

(Seal)

Acting Commissioner of Patents.

DISCLAIMER

2,140,311.—*Joseph H. Cohen, Bridgeport, Conn. CIGAR LIGHTER. Patent dated December 13, 1938. Disclaimer filed November 6, 1940, by the assignee, Automatic Devices Corporation.*

Hereby enters this disclaimer to claims 3, 20, and 26 of the patent.
[Official Gazette December 3, 1940.]

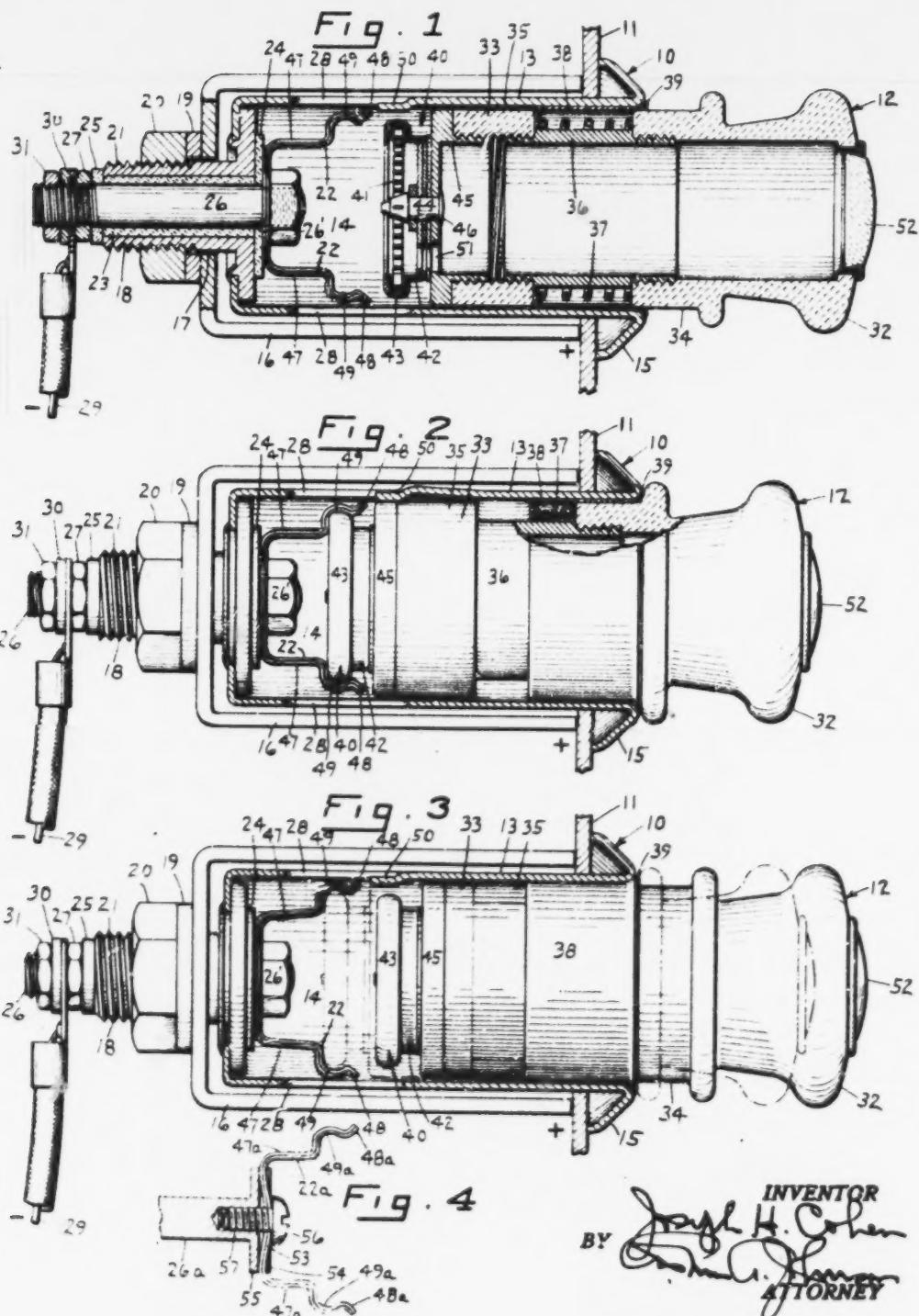
May 10, 1938.

J. H. COHEN

2,117,232

CIGAR LIGHTER

Filed March 29, 1933



INVENTOR
Joseph H. Cohen
ATTORNEY

DISCLAIMER

2,117,232.—*Joseph H. Cohen, Bridgeport, Conn. CIGAR-LIGHTER. Patent dated May 10, 1938. Disclaimer filed March 19, 1941, by the assignee, Automatic Devices Corporation.*

Hereby enters this disclaimer to claims 1, 2, 10, 11, 16, 17, and 18 of the patent.
[Official Gazette April 22, 1941.]

This invention relates to electric cigar-lighters, and more particularly, to devices of this character for use with automobiles, although it is applicable for home, office and other similar use. More specifically, it is an improvement over that form of automatically controlled cigar-lighter shown in my copending application Serial No. 624,193, filed July 23, 1933.

In my aforesaid application, I have disclosed a cigar-lighter with novel forms of structure adapted to normally support the removable igniting unit in an inoperative position in a socket and arranged to maintain a circuit controlling interponent in an energizing position until the igniting unit is heated a predetermined extent, whereupon thermostatic means releases the interponent and allows it to move the removable igniting unit back into the inoperative position in the socket again.

It is an object of the present invention to provide a cigar-lighter having many of the advantages of my aforesaid invention just described, but which will be simpler mechanically, more economical to manufacture and more positive and fool-proof in its action.

A feature of the present invention is the provision of a cigar-lighter which may be applied to its base with a straight and natural longitudinal movement and moved from an inoperative position to an operative or energizing position on the base with the same natural straight line movement. Also, a novel thermostatic control arranged to catch the removable igniter unit directly and hold it in energizing position for a pre-determined period.

Another feature is the provision of a catch on the stationary member of the cigar-lighter having a direct mechanical and electrical connection with the heater element portion of the removable igniting unit to be advantageously heated directly by both radiation and convection.

A further feature is the provision of a novel arrangement for varying the degree of heat given to the resistance element and to compensate for wear of parts.

Yet another feature is the provision of a thermostatic detent adapted to catch and hold the removable igniting unit directly in an energizing position deep in a socket against spring pressure until properly heated and then release it for partial ejection from the socket for use, and for safety clearance from the feeder contacts. This feature of construction is also arranged to give a mechanical click or knock to audibly warn the

operator that the device is ready and steady for use.

Other features and advantages will hereinafter appear.

In the drawing—

Figure 1 is a completely cross section view taken axially through the center of the device, with the removable igniting unit at the inoperative position in the stationary member.

Fig. 2 is a view similar to Fig. 1, with fewer parts in cross section, and with the igniting unit in the energized position.

Fig. 3 is a view similar to Fig. 2, but shows the catch in its expanded position and the removable igniting unit moved back again to its inoperative station in the socket.

Fig. 4 is a detail view of a modified form of thermostatic contact.

The cigar-lighter selected for illustrating the present invention is of the so-called sleeve type for use with automobiles and comprises a base member 10 for attachment to a panel 11 of an automobile, and a removable igniting unit 12 which is normally supported by the base member, but which may be mechanically and electrically disconnected for manual transportation within the car and for handling by various occupants therein for the purpose of lighting cigars, cigarettes and the like.

The base member 10 comprises a sleeve 13 forming a deep socket 14 adapted to pass through a suitable aperture in the instrument panel 11 until a flange 15 on the front end thereof engages with the instrument panel. It is held in this position on the panel by a U-shaped yoke 16 having an aperture 17 passed over a contact sleeve 18 at the bottom of the socket 14 where it is tightened in position and the flange 15 portion of the socket 14 drawn firmly into engagement with the panel 11 by a washer 19 and nut 20 run up and tightened on the thread 21 portion of the contact sleeve 18.

The U-shaped yoke, in addition to clamping the base member in place, serves through the washer 19, nut 20 and sleeve 18 to conduct grounded current to the socket 14 if the flange 15 seating on the front face of the panel 11 fails in this function.

The base member also supports and carries an insulated contact 22. This contact, in its present preferred form, is insulated from the socket by a collar 23 passing through a bore of the sleeve 18 and insulating washers 24 and 25 at the front and rear ends of the sleeve, and it is held in place on a shouldered stud 26 by a nut 26' and is then

passed through the insulating members just described where it is rigidly secured with a primary nut 21. This primary nut serves to locate and hold the contact 22 relative to the socket 14 so that the contact cannot rotate within the socket and inadvertently move away from clearance slots 28 in the side of the socket and harmfully engage with the sleeve 18 carrying an opposite pole of the circuit.

10 A feed wire 29 is connected to the stud 26 and is secured to the latter by a washer 30 and secondary nut 31. Thus, the base member is provided with members (the socket 14 and contact 22) terminating both sides of a car circuit 15 which are insulated from each other.

The removable igniting unit 12 comprises a knob or handle 32, and a plunger section 33 adapted to slidably fit into the socket 14 and support the igniting unit therein. This plunger section comprises a shoulder 34 on the knob 32 and an aligning sleeve 35 spaced forwardly therefrom by a threaded and shouldered collar 36. It should be particularly noted that this structure forms a support for a spring 37 and sleeve 38, 20 the latter being provided with a flange 39 adapted to engage the front of the socket 14 and limit movement into the socket while the spring 37 normally urges the knob section of the igniting unit rearwardly with respect to the collar in order to 25 prevent the igniting unit from engaging with the fixed contact in the base member if the unit is initially mounted into the socket and yet adapted to yield and permit the unit to be moved forwardly by conscious effort.

30 The igniting unit 12 is completed with a heater unit 40 preferably having a threaded connection with the auxiliary sleeve 35 which is made of insulation in order to properly insulate the heater unit from electrical connection with the base member 18 and with the spacing sleeve 38 portion of the igniting unit. This heater unit comprises a resistance element 41 in the form of a spirally wound band supported in and connected at its outer end to a metal cup 42 where it is 35 secured in place with an overlapping ring 43, and is at its other end supported by and connected to a centrally disposed stud 44 which passes through the cup 42 and a threaded sleeve 45 and rigidly secured in place by the headed section 46 thereof. The stud 44 provides an electrical connection between the threaded sleeve 45 and the inner end of the spirally wound resistance element, but is insulated from the cup 42 and other end of the resistance element by 40 three washers best seen in Fig. 1.

Now, it should be particularly noted that the stationary contact 22 on the base member 18 is made of bimetallic strips so as to be thermally responsive and expand upon heating, and is 45 arranged to normally embrace the heater unit and thereby hold the igniting unit in the socket 14. To this end it is preferably provided with two fingers 47 at opposite sides of the center and spaced wide apart. Also, the fingers are 50 of substantial length in order to provide considerable resiliency. These fingers are at their outer ends provided with a bevel 48 adapted to be engaged by the collar 43 on the heating unit 40, and are provided with a concave notch 49 conforming substantially with the contour of the 55 collar 43. The shape of these parts and the relationship between the fingers 47 and collar section 43 of the heating unit 40 is such that the fingers are first spread apart by the collar as 60 the igniting unit is moved rearwardly in the

socket 14, until the concave notches snap over the collar and hold the igniting unit in the back position within the socket as shown in Fig. 2, the resiliency of the contact fingers 47 and holding strength of the concave notches being stronger than the pressure of the compressed spring 37 while the igniting unit is initially in the back position.

In this back position current is transmitted from the ungrounded stationary contact 22 through the collar 43 to the outer end of the resistance element 41 while the grounded circuit in the base member is transmitted to the resistance element through a spring finger 50, preferably lanced from the side of the sleeve 18, engaging the outer wall of the threaded sleeve 45 and through the latter and the stud 44 passed to the inner end of the resistance element, whereupon the resistance element is gradually brought to incandescence for the purpose of cigar and cigarette lighting.

As the resistance element is brought to incandescence, heat is passed to the collar 43, thence to the ends of the fingers 47 for direct mechanical transmission of heat and is also radiated substantially against the fingers whereupon the thermally responsive bimetallic strips, comprising the contact 22, begin to expand and gradually carry the concave notches 49 on the arms 47 out of engagement with the collar 43 portion of the igniting unit, the parts being so proportioned that the contact 22, when cold, catches and holds the igniting unit 12 back into the energizing position until the resistance element is brought to a white heat or to another predetermined degree of incandescence. Thereafter, the contacts and the catch formed thereby releases its hold upon the igniting unit and the spring 37 and sleeve 38 assembly on the igniting unit quickly moves the latter to the back in operative position shown in Fig. 3.

The degree of incandescence may also be indicated to an operator by the provision of several aligned holes in the cup 42, insulating washers and threaded sleeve 45, as shown at 51 in Fig. 1, which permit light rays to pass through the bore of the igniting unit and rearwardly through the disk 52 which is preferably made of catalin or other light ray conducting material.

Operation of the device is as follows:

The removable igniting unit 12 is normally moved into the socket 14 to the inoperative position shown in Fig. 1 where the flange 39 on the spring sleeve 38 engages the flange 15 of the socket. The parts are so arranged that the unit moves easily into this position and special effort is required to move it deeper into the socket after the flange engages the shoulder. Thus, the operator releases the removable igniting unit after it is properly located in the socket in the normal rest or inoperative position.

When it is desired to energize the removable igniting unit, the operator merely presses the igniting unit deeper into the socket 14 in a straight line direction and without rotation or special aligning effort against the pressure of the spring 37 until the collar 43 on the heating element 40 spreads the ends of the two spring contact fingers 47 apart and deep enough so that the concave notches 49 snap over the collar to hold the igniting unit in the back or operative position deep in the socket for energization by the contacts 22 and 50 cooperating with the collar 43 and threaded sleeve 45. The operator may, with the present invention, immedi-

ately take his hand away from the igniting unit again and grasp the wheel, gear shift lever, or other part of the car again for efficient and regular operation of the car, rather than holding the igniting unit in place as with the usual type of lighter while the resistance element 41 is being heated to incandescence for use.

At the same time, the heating unit 40, by convection and radiation as hereinbefore described, heats the thermally responsive contact 22 and causes the two arms 41 to spread apart slowly as the heating unit is being brought to the proper degree of incandescence. When properly heated, the notches 41 clear the collar 43 and allows the spring 37 to push the igniting unit outwardly with respect to the socket 14 and thereby hold the contacts on the heating unit 40 clear of the feeder contacts 22 and 58 on the base 10. In this latter movement, there is a snap noise as the flange on the spring sleeve 38 engages the back wall of the auxiliary sleeve 35 which will be heard by the operator to warn him that the removable igniting unit is satisfactorily heated and ready for use and that it should be used without delay while the heating unit is incandescent.

Thus, the present invention provides a simple automatic control, which, in effect, grasps and holds the removable igniting unit itself in energizing position until it is properly heated and thereupon releases it and automatically moves it out of electrical connection after it is properly heated into a position of safety with respect to the feeder contacts on the base, thereby minimizing the possibility of excessive drain on the battery or other source of current. The direct mechanical connection between the heating unit and the bimetallic contact provides an economical structure, and, more particularly, provides a construction which is direct and highly responsive to the heating of the resistance element. Furthermore, the contact 22 which forms the catch receives heat directly by convection and radiation from the resistance element.

In Fig. 4 there is shown a modified form of combined catch and contact 22a comprising a bimetallic strip which is substantially similar to the preferred form shown in Figs. 1 to 3. It is, however, provided with a bowed base 53 adapted to fit into a slot 54 across the head 55 of a bolt 26a in order to prevent relative turning and is held on the bolt by a screw 56 passing through the base 53 and having a threaded connection 57 with the bolt. This contact is also provided with a pair of arms 41a having bevels 48a and concave notches 49a to receive the removable igniting unit 12 in much the same manner as the first form of contact hereinbefore described. However, this modified form of contact has the advantage of making it possible to easily and quickly change the pressure of the catch on the removable igniting unit and thereby increase or decrease the degree of incandescence before release is effected by simply tightening the screw 56 and thereby flattening the bowed base of the contact and at the same time moving the fingers 41a toward each other to increase the pressure and by loosening the screw allowing the bowed section to move outwardly again while the fingers likewise spread outwardly in order to decrease the pressure of the catch on the igniting unit and thereby effect a quicker release. This adjustment is particularly advantageous in order to compensate for any stretch or wear of the contact from continuous use or from constant heating and cooling. The adjustment may be easily effected

by simply inserting a screw driver into the socket and turning the screw 56 in the desired location.

Both forms of the invention have the advantage of partially ejecting the igniting unit from the base into a more convenient position for complete removal, and, at the same time, the partially ejected relative location of these parts provides an auxiliary warning to the operator that the igniting unit is in condition for use if he fails to hear the mechanical click of the igniting unit as it is ejected to the back position or if he hears some extraneous click which he thinks is the cigar-lighter, for in the latter situation the igniting unit would still be in the deep position and visually indicate to the operator that it is not yet properly heated.

If preferred, the contact member 22 or 22a may be made with but a single finger 41 or 41a respectively by omitting the finger as shown with dot-and-dash lines in Fig. 4.

The broader aspects of the invention herein disclosed are described and claimed in my pending applications Serial No. 624,193, filed July 23, 1932, and a division thereof, Serial No. 118,838, filed January 2, 1937.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new and for which it is desired to obtain Letters Patent, is:—

1. In an electric cigar-lighter, the combination of a stationary base member; a socket in the base member; a removable igniting unit longitudinally manually slideable in said socket from a shallow inoperative to a deep operative position; yielding means normally forcing said igniting unit from said deep operative position to said shallow inoperative position; cooperating contacts on the igniting unit and the base member respectively, adapted to engage when the igniting unit is in said deep operable position and disengage when in said shallow inoperative position, one of the contacts on the base member extending into the path of movement of one of the contacts on the igniting unit so that said contacts are maintained in good electrical engagement by the tendency of the igniting unit to move toward inoperative position; and a spring detent adapted to catch and releasably hold the igniting unit deep in the socket in the operative position against the pressure of said yielding means and as a result of said longitudinal movement of the igniting unit to said operative position.

2. In an electric cigar-lighter, the combination of a base member; a socket on the base member; a removable plug manually longitudinally slideable in said socket to a shallow inoperative position and into a deep operative position; a heating coil on said removable plug; yielding means normally urging said removable plug longitudinally from said deep operative position to said shallow inoperative position; cooperating contacts on the igniting unit and the base member respectively, adapted to engage when the igniting unit is in said deep operable position and disengage when in said shallow inoperative position, one of the contacts on the base member extending into the path of movement of one of the contacts on the igniting unit so that said contacts are maintained in good electrical engagement by the tendency of the igniting unit to move toward inoperative position; and a thermally responsive catch adapted to hold said plug in the deep operative position normally and to release said plug when

said heating coil is energized a predetermined extent, whereupon said yielding means ejects said plug longitudinally from the deep operative position to the shallow inoperative position, said catch being rendered operative as a result of the longitudinal movement of the igniting unit into said operative position.

3. In an electric cigar-lighter, the combination of a base member; a socket in the base member; a removable igniting unit including a spacing sleeve with a knob and collar secured thereto forming shoulders at opposite ends thereof; and yielding means, including a spring and sleeve on said spacing collar between the two shoulders, forming a support for the removable igniting unit in said socket normally in a back inoperative position and yieldable to permit forced travel of the igniting unit deeper into the socket to an operative position.

20 4. In an electric cigar-lighter, the combination of a base member; a socket in the base member; an escutcheon flange on the base member; a removable igniting unit including a spacing sleeve with a knob and collar secured thereto and forming shoulders at opposite ends thereof; and yielding means, including a spring and sleeve having a flange engaging the escutcheon flange on said spacing collar between the two shoulders, forming a support for the igniting unit in said socket normally in a back inoperative position and yieldable to permit forced travel of the movable igniting unit deeper into the socket to an operative position.

25 5. In an electric cigar-lighter, the combination of a base member; a removable plug supported by said base member; a heating element on said plug; and a thermostatic catch on the base member directly engaging the heating element for locking the plug in the base member until the heating element is heated a predetermined extent.

30 6. In an electric cigar-lighter, the combination of a stationary base member; a plug adapted to be removably supported in said base; a heating element on said plug; yielding means normally urging the plug member away from the base member; and a thermostatic catch on the base member directly engaging the heating element adapted to lock the plug member in the base member against the pressure of the yielding means and adapted to release and allow the plug to be moved away from the base member under the influence of the yielding means when the heating element is heated a predetermined extent.

35 7. In an electric cigar-lighter, the combination of a base member; a removable plug supported on the base member and movable longitudinally thereon into operative and inoperative positions; an electrical heating coil on said plug; a ferrule surrounding the coil, and a thermostatically controlled catch for locking said plug in its operative position longitudinally and adapted to release automatically so that the plug may return to its inoperative position longitudinally when said coil is heated a predetermined extent, said catch comprising a bimetallic detent adapted to snap over the ferrule and thereby lock the plug in operative position.

40 8. In an electric cigar-lighter, the combination of a base member; a socket in the base member; a plurality of contacts of opposite polarity on the base member; a removable igniting unit; a plurality of contacts of opposite polarity on the igniting unit, said igniting unit having a free slid-

ing fit into a shallow inoperative position in the socket where the plurality of contacts on the said igniting unit are entirely free of the said contacts on the base member; yielding means adapted to permit forced movement of the igniting unit deeper into said socket to an energizing position where said plurality of contacts on the base member and said plurality of contacts on the igniting unit are brought into cooperating engagement; and a thermostatic catch for holding said igniting unit in the energizing position for a predetermined period of time.

45 9. In an electric cigar-lighter, the combination of a base member; a socket in the base member; a stationary contact in the base member; a combined thermostatic catch and contact in the base member; a removable igniting unit; a plurality of contacts on the igniting unit; a stop on the igniting unit for limiting free sliding movement of the igniting unit into a shallow position in the socket, where the two contacts on the latter are entirely free of the two contacts on the base member; and yielding means necessitating a forced travel of the igniting unit deeper into the socket into an energizing position where the contacts on the base member and on the igniting unit cooperate, and where the combined catch and contact on the base member holds the igniting unit in the energizing position until the igniting unit is properly heated.

50 10. In an electric cigar-lighter, the combination of a base; a socket in the base; a removable plug slideable in said socket to a shallow inoperative position and a deep operative position; a heater element carried by said plug; a pair of contacts associated with the heater element; a plain contact on the base member engaging one of the contacts of the heater element; and a bimetallic combined contact and catch adapted to engage the other contact of the heater element in close proximity thereof so as to be heated directly by radiation and conduction from the heater element.

55 11. In an electric cigar-lighter, the combination of a base; a socket in the base; a removable plug slideable in said socket to a shallow inoperative position and a deep operative position; a heater element carried by said plug; a pair of contacts associated with the heater coil; a plain contact on the base member engaging one of the contacts of the heater element; and a contact having a bimetallic spring arm with a notch adapted to catch and hold the other contact on the heater element and in close proximity thereof so as to be influenced directly by radiation and conduction of heat from the heater element.

60 12. In an electric cigar-lighter, the combination of a base; a socket in the base; a removable plug slidably movable in said socket to a shallow inoperative position and a deep operative position; means for partially ejecting the plug from the socket; a heater element carried by said plug; a pair of contacts associated with the heater coil; a plain contact on the base member engaging one of the contacts of the heater coil; a bimetallic catch and contact including a plurality of yielding arms thermally influenced by said heater element; notches in said arms adapted to catch and hold said removable plug in the deep operative position of the socket; and means for varying the spacing between said arms and the pressure with which they catch the removable plug, in order to control the degree of incandescence of the heater coil prior to release of

the notches from the heater element and the ejection of the removable plug.

13. In an electric cigar-lighter, the combination of a base; a socket in the base; a removable plug slidably movable in said socket to a shallow inoperative position and a deep operative position; means for partially ejecting the plug from the socket; a heater element carried by said plug; a pair of contacts associated with the heater coil; 10 a plain contact on the base member engaging one of the contacts of the heater coil; a bimetallic contact for engaging the other contact on the heater coil and being thermally responsive thereto including an arm with a notch adapted to engage and hold said removable plug in the deep operative position; and means for varying the pressure with which said arm engages and holds said removable plug to effect a predetermined energization of the heater coil.

14. In an electric cigar-lighter, the combination of a base; a socket in the base; a removable plug slidably movable in said socket to a shallow inoperative position and a deep operative position; means for partially ejecting the plug from the socket; a heater element carried by said plug; a pair of contacts associated with the heater coil; a plain contact on the base member engaging one of the contacts of the heater coil; a bimetallic contact for engaging the other contact on the heater coil and being thermally responsive thereto including an arm with a notch adapted to engage and hold said removable plug in the deep operative position; and screw means for flattening said bowed base and thereby varying the pressure with which said arm engages and holds said removable plug to effect a predetermined energization of the heater coil.

15. In an electric cigar lighter, the combination of a stationary base member; a socket in the base member; a removable igniting unit longitudinally slideable in the socket into a shallow inoperative position and a deep operative position; yielding means normally forcing said igniting unit from said deep operative position to said shallow inoperative position; a heating element on the inner end of the igniting unit and having a projecting flange; and a spring detent adapted to engage said flange on the heating element and releasably holding the latter and the igniting unit deep in the socket into operative position against pressure of said yielding means and as a result of said longitudinal movement of the igniting unit to said operative position.

16. In an electric cigar-lighter, the combination of a stationary base member; a socket in the base member; a removable igniting unit longitudinally manually slideable in said socket from a shallow inoperative to a deep operative position; a heating element carried by said igniting unit; cooperating contacts on the base and igniting unit respectively for energizing said heating element only when the igniting unit is in said deep operative position, one of the contacts on the base member extending into the path of movement of one of the contacts on the igniting unit; yielding means normally forcing said igniting unit from said deep operative position to said shallow inoperative position and deenergizing the heating element, said forcing means by tending to move the igniting unit toward shallow position causing said cooperating contacts to maintain good electrical engagement when the igniting unit is in energizing position; and means operable to engage and detain the igniting unit in its deep oper-

ative position against the pressure of said yielding means when the said unit is manually moved to said position while it is below an intended temperature and also operable to nondetaining relation to said unit when the latter is heated to said temperature so as then to allow said yielding means to move the unit to its shallow inoperative position.

17. A lighter as defined in claim 16, wherein the means last-mentioned includes a thermostat.

18. In an electric cigar-lighter, the combination of a stationary base member; a socket in the base member; a removable igniting unit longitudinally manually slideable in said socket from a shallow inoperative to a deep operative position; yielding means normally forcing said igniting unit from said deep operative position to said shallow inoperative position; and means operable to engage and detain the igniting unit in its deep operative position against the pressure of said yielding means when the said unit is manually moved to said position while it is below an intended temperature and also operable to nondetaining relation to said unit when the latter is heated to said temperature so as then to allow said yielding means to move the unit to its shallow inoperative position, the means operable to engage the igniting unit including a metallic thermostat itself shaped to provide a spring catch engageable with said unit when the unit is manually moved to deep operative position and the unit is below said intended temperature.

19. In an electric cigar-lighter, the combination of a stationary base member; a socket in the base member; a removable igniting unit longitudinally manually slideable in said socket from a shallow inoperative to a deep operative position; yielding means normally forcing said igniting unit from said deep operative position to said shallow inoperative position; and means operable to engage and detain the igniting unit in its deep operative position against the pressure of said yielding means when the said unit is manually moved to said position while it is below an intended temperature and also operable to nondetaining relation to said unit when the latter is heated to said temperature so as then to allow said yielding means to move the unit to its shallow inoperative position, the means operable to engage the igniting unit including a thermostat, the igniting unit including a carrier for the heating element thereof, and said carrier being engaged by the means which includes the thermostat when said means retains the igniting unit in its deep operative position.

20. In a cigar-lighter of the removable type, a holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to solely bodily movement of the igniting unit and heating element toward the holder to close a current supply circuit, including the heating element, to heat the latter for use; means, including means responsive to the temperature of the heating element, for moving the igniting unit outwardly of the holder when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element, said temperature responsive means being metallic and constituting a part of the current supply circuit including an electric current supply contact having a surface to normally engage and disengage the heating element directly and being movable to open the circuit when the heating element attains said predetermined heat; and means for electrically

connecting said heating element to said temperature responsive means when the latter is in circuit-opening position to again close the circuit whereby the temperature of the heating element may be raised above said predetermined temperature.

21. In a cigar-lighter of the removable type, a holder; an igniting unit movably mounted on the holder and including a heating element; means responsive to movement of the igniting unit and heating element on the holder from a normal open circuit position to close a current supply circuit, including the heating element, to heat the latter for use; means, including means responsive to the temperature of the heating element, for moving the igniting unit on the holder to normal position when the heating element attains a predetermined temperature to open the current supply circuit leading to the heating element, said temperature responsive means being metallic, engaging directly the heating element and constituting a part of the current supply circuit and being movable to open the circuit when the heating element attains said predetermined heat; and means for electrically connecting said heating element to said temperature responsive means when the latter is in circuit-opening position to again close the circuit whereby the temperature of the heating element may be raised above said predetermined temperature.

22. In a cigar lighter, the combination of a

socket; an igniting unit mounted in said socket for complete removal and replacement; a heating element on the inner end of said igniting unit and including a resistance wire and an annular contact connected thereto and closely thermally encircling said resistance wire; a contact finger in the socket to directly engage the annular contact on the heating element and be heated thereby; and means completing an energizing circuit through said resistance wire, said contact finger being heat-responsive so as to electrically disengage said annular contact when the said resistance wire is brought to a desired degree of incandescence.

23. In a cigar lighter, the combination of a socket; an igniting unit mounted in said socket for complete removal and replacement; a heating element on the inner end of said igniting unit and including a resistance wire and an annular contact connected thereto and closely thermally encircling said resistance wire; a contact finger in the socket to directly engage the annular contact on the heating element and be heated thereby; and means completing an energizing circuit through said resistance wire, said contact finger being bimetallic and heat-responsive so as to electrically disengage said annular contact when the said resistance wire is brought to a desired degree of incandescence.

JOSEPH H. COHEN. 30

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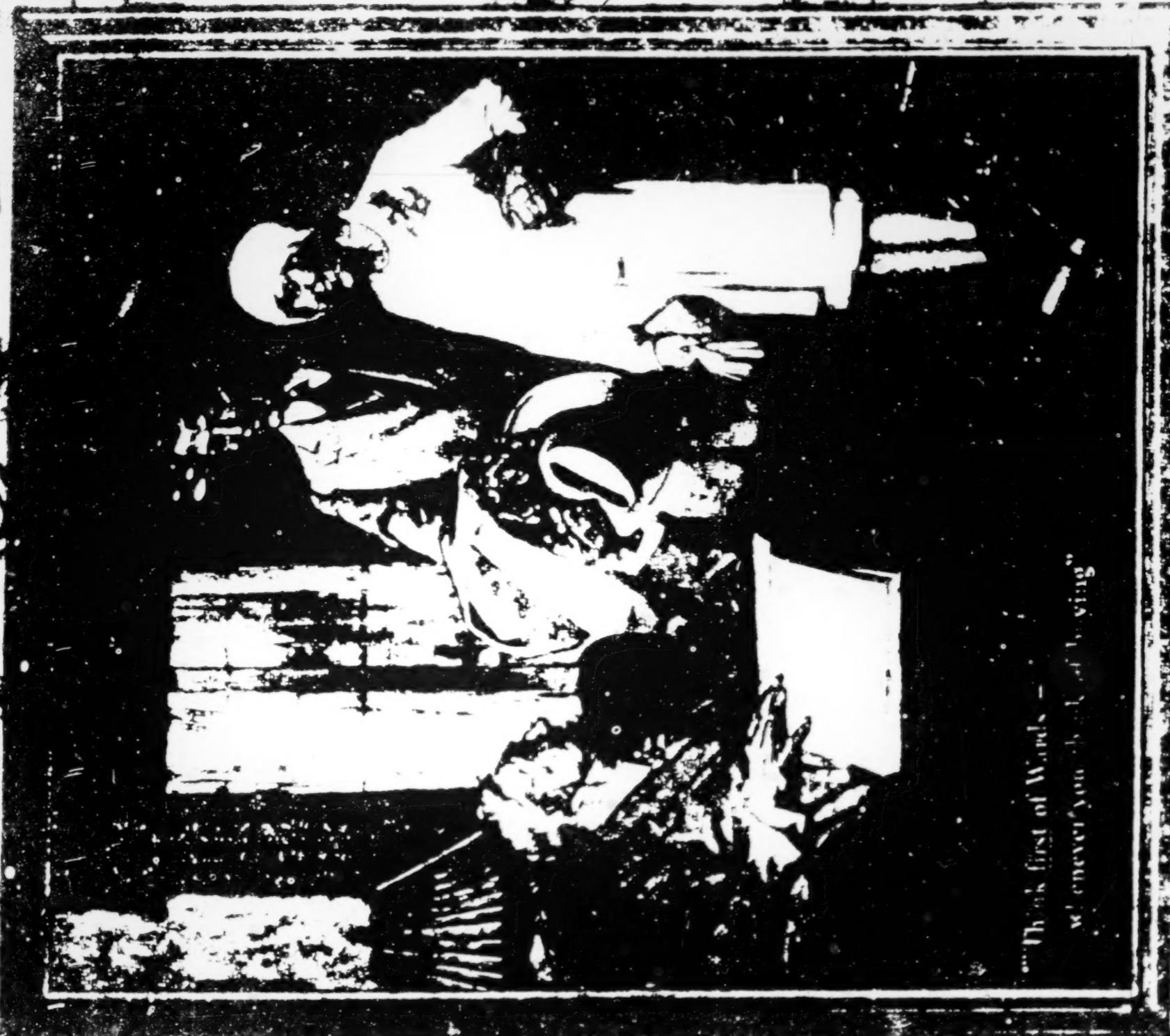
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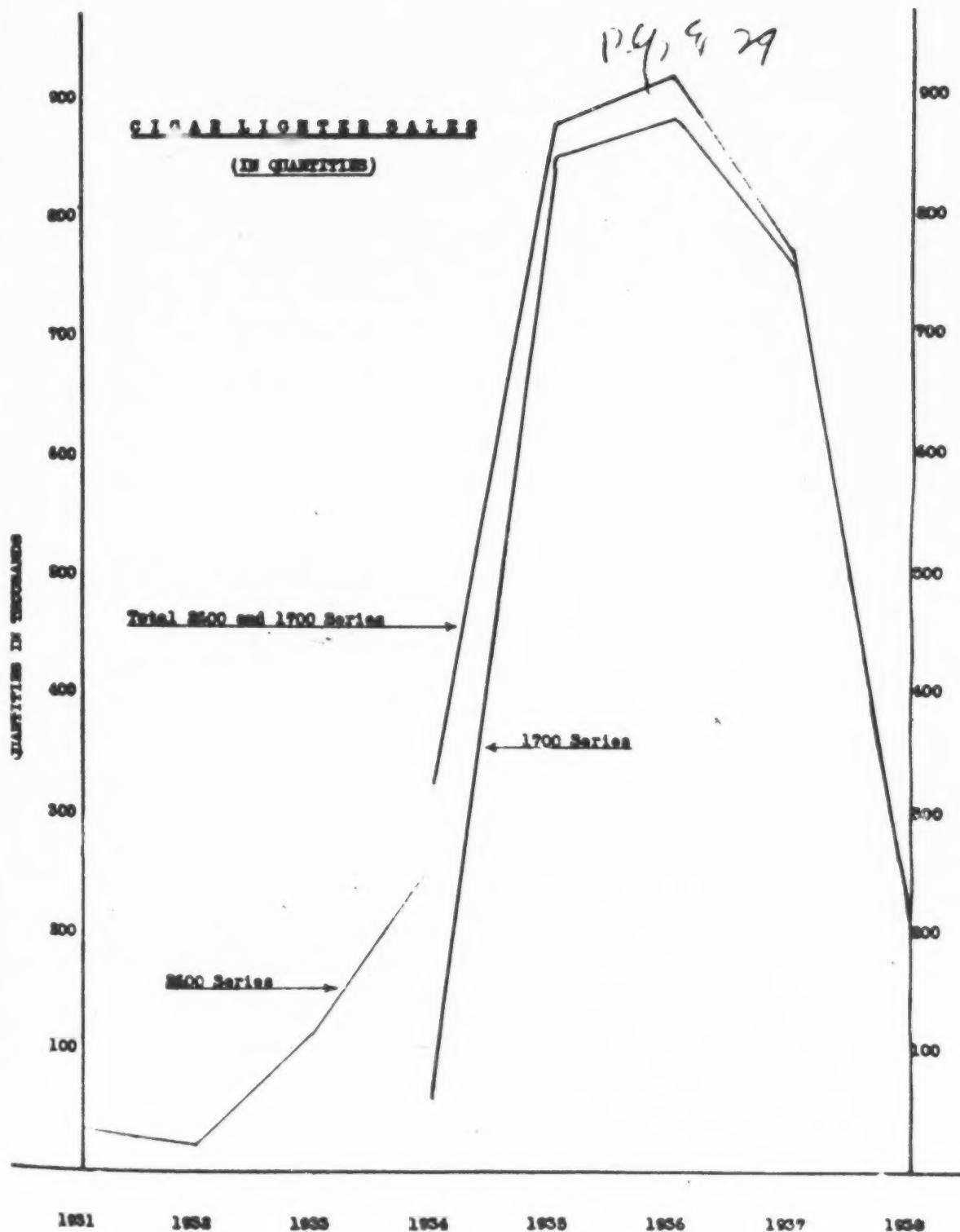
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285,200 COMPLETE SPECIFICATION

1 SHEET

Fig. 1.

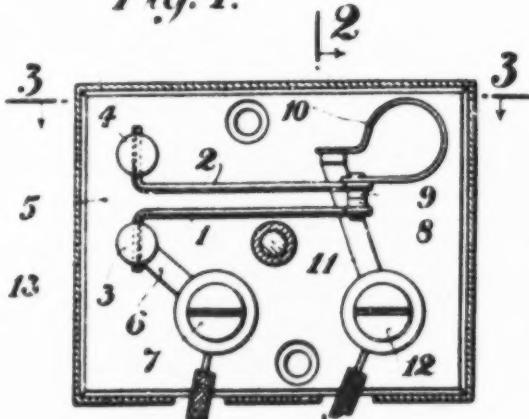


Fig. 2.

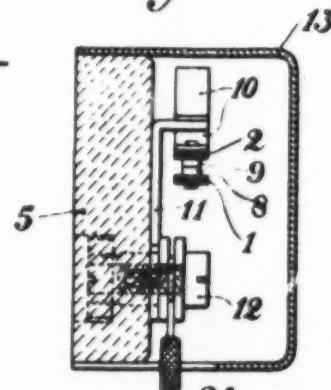


Fig. 3.

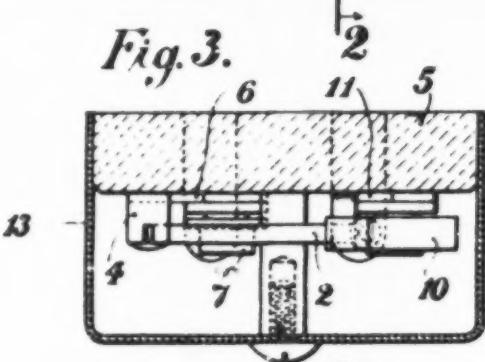


Fig. 4.

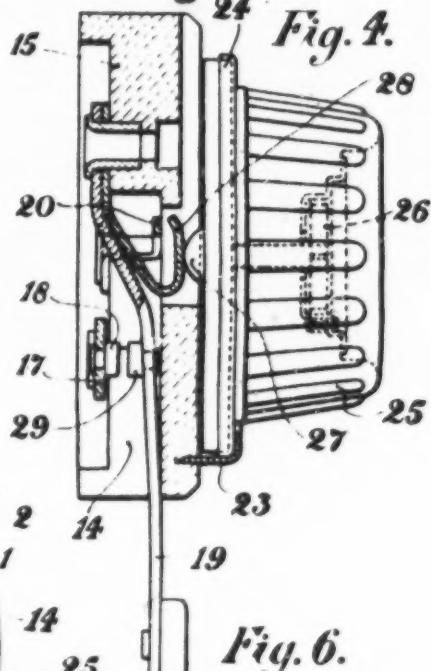


Fig. 5.

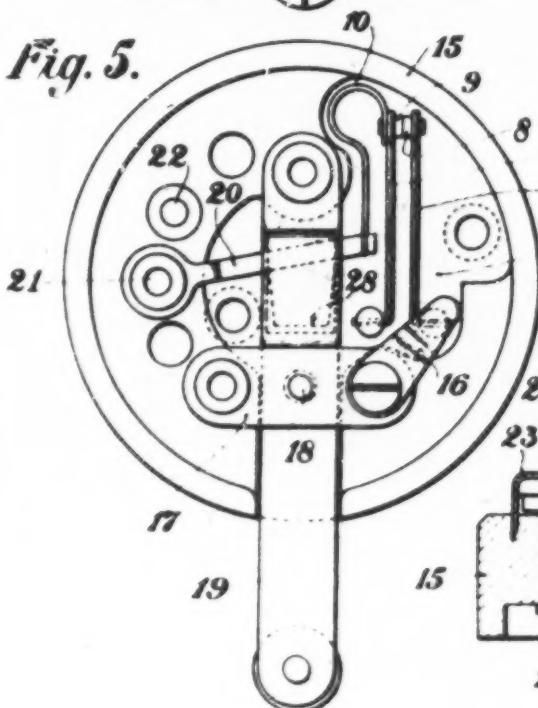
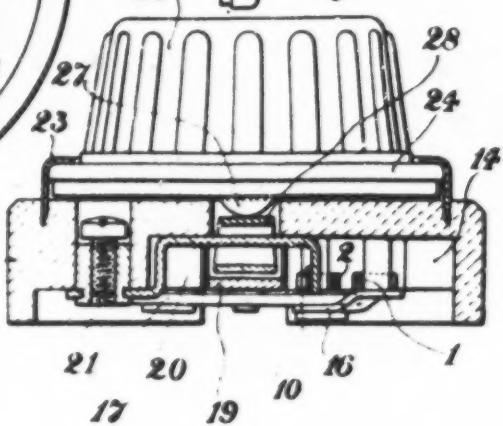


Fig. 6.



This Drawing is a reproduction of the Original on a reduced scale.

PATENT SPECIFICATION



Application Date: Dec. 14, 1926. No. 31,643 / 26.

285,200

" " May 31, 1927. No. 14,563 27.

One Complete Left: June 2, 1927.

Complete Accepted: Feb. 16, 1928.

PROVISIONAL SPECIFICATION.

No. 31,643, A.D. 1926.

Automatic Cut-out for Electric Cigar and Cigarette Lighter.

We, S. SMITH AND SONS (MOTOR ACCESSORIES) LIMITED, a company registered under the laws of Great Britain, of Central Works, Edgware Road, Cricklewood, London, N.W. 2, FREDERICK WILLIAM MILLER, a British subject, of "Hazeldell", Aylesbury Road, Hockley Heath, Warwickshire, and FREDERICK MILLER, a British subject, of "Hazeldell", Aylesbury Road, Hockley Heath, Warwickshire, do hereby declare the nature of this invention to be as follows:—

This invention is for automatically switching off the electric current running through the resistance of a cigar or cigarette lighter and preventing the resistance from fusing, which is usually caused through holding down the switch too long. Our method of preventing burning out the resistance is as follows. On base plate of lighter is the positive terminal stud and in contact with this

stud is the end of a strip of thermostatic metal which allows current to pass through this metal to another stud which carries the current through the resistance filament to the negative terminal. As the resistance filament reaches the maximum heat, the actual heat from the resistance causes the thermostatic metal to expand or contract and so breaks the circuit and can be regulated either to keep the lighter at an even heat or to automatically glow and cool.

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30

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Dated this 13th day of December, 1926.

S. SMITH & SONS (MOTOR ACCESSORIES) LIMITED,

* ALEXANDER SMITH,
SAM. SMITH,

Directors,

H. WARWICK,
Secretary,

F. W. MILLER,
F. MILLER.

PROVISIONAL SPECIFICATION.

No. 14,563, A.D. 1927.

Improvements relating to Electric Cigar, Cigarette and like Lighters.

We, S. SMITH AND SONS (MOTOR ACCESSORIES) LIMITED, a company registered under the laws of Great Britain, of Central Works, Edgware Road, Cricklewood, London, N.W. 2, FREDERICK WILLIAM MILLER, British subject, and FREDERICK MILLER, British subject, both of 68, Nansen Road, Sparks Hill, Birmingham, do hereby declare the nature of this invention to be as follows:—

This invention relates to electric cigar, cigarette, pipe and like lighters of the resistance type, such as are used in motor-cars and other vehicles or in other places for the convenience of smokers.

With lighters of the above type, if the switch is held closed for too long, the high resistance wire or filament becomes unduly heated and rises, thus putting the lighter out of action.

The object of the present invention is to obviate this disadvantage appertaining to resistance lighters, and to provide, in conjunction with the lighter, an automatic cut-out or protective device which will prevent the fusing of the resistance wire and which may be arranged to maintain the lighter at a substantially uniform glowing temperature no matter how long the switch may remain closed.

According to the invention, a thermo-

[Price 1/-]

statically-controlled switch or make-and-break device is included in the lighter circuit, the controlling thermostat being arranged to be influenced by the heating effect of the current flowing or by the temperature of the heater so as to break the circuit before the fusing temperature of the resistance wire is reached. Conveniently the current flows through the 5 thermostat, which carries or operates a switch contact in the circuit, so that it is heated by the current and breaks the circuit. As the thermostat cools it again closes the circuit and so long as the 10 lighter switch remains closed, the thermostat repeatedly opens and closes the circuit, thereby avoiding overheating of the resistance wire, which, in this manner, may be arranged to be maintained at a 15 substantially uniform, or at a variable, glow, as desired. Preferably, a second thermostat element is employed to compensate for the effect of variations in the 20 temperature of the atmosphere in which the main or controlling thermostat is 25 situated due to external influences, such as the heat of the engine or climatic conditions. Without this compensating 30 thermostat variations in the temperature of the surrounding atmosphere, due to causes other than the temperature of the heater, would possibly influence the main thermostat element and cause the circuit to be opened when the lighter was not in 35 use, or cause the contact to be opened too far when the current flowed through the said element. The said compensating 40 thermostat is arranged to carry the contact with which the contact controlled by the main thermostat co-operates, and is influenced by external temperature conditions to the same extent as the main 45 thermostat, so that any variation in such temperature conditions will affect both contacts equally.

In carrying out the invention in a form suitable for use with an existing lighter, the cut-out device comprises two parallel bi-metallic thermostatic strips preferably composed of nickel and brass, one strip constituting a main controlling thermostat and the other functioning as a compensating thermostat, as hereinafter described. These strips are fixed at one 50 end to suitable metallic studs or posts secured upon a base plate of insulating material and the stud or post carrying the main thermostatic strip is connected by a suitable conductor to a terminal 55 on the said base plate said terminal being adapted to be connected in the electric circuit of the lighter. The said strip carries at its free end a contact point of any suitable material, such as nickel, and this 60 contact point normally engages a similar

contact point carried upon the free end of the other or compensating strip. The said free end of this latter strip is riveted or otherwise directly connected to one end of a light flexible bow spring, the other end of which is fixed to a conducting strip or bar connected to a second terminal on the base plate, the said terminal being connected to the lighter circuit. The bow spring acts as a flexible conductor for the current and also assists normally to maintain the contact points together. 70

When the lighter switch is closed the current flows from the one terminal through the main thermostatic strip, traverses the closed contact points, and passes through the bow spring and conducting bar to the other terminal. The said main thermostatic strip is made of such a resistance that when the resistance filament of the lighter attains a bright red glow, and before the fusing point of the said filament is reached, the heating effect of the current passing through the strip causes the latter to deflect away from the compensating strip and the contact points to separate, thus breaking the circuit. The main strip thus commences to cool and returns to its former position, the contact points coming together and (if the main lighter switch remains closed) again completing the circuit, the operation being repeated so long as the said main lighter switch remains closed. It can be arranged for the interval between the breaking and re-closing of the circuit to be very short so that the lighter will be maintained at a substantially uniform glow, or the interval can be longer so that the lighter will alternately glow and cool. 100

The cut-out may be enclosed by a detachable cover suitably secured to the base plate.

The compensating thermostatic strip has a similar deflection characteristic to the main strip, so that if the temperature of the surrounding atmosphere varies, due to the heat of the engine or by reason of climatic conditions, both the said compensating strip and the main thermostatic strip, will move together and to the same extent, so that the contact points will remain closed until a current passes through the main strip. Thus the opening of the circuit is dependent solely upon the heating effect of the current. In a modification, however, it may be arranged for the circuit-controlling thermostatic element to be placed close to the resistance filament so as to be influenced by the heat radiated therefrom in order to open the circuit before the fusing point of the filament is reached. In this case, however, the compensating thermostat, while moving in the same direction, would have a 130

different deflection characteristic from the main thermostat, so that the contacts would remain together during small variations in temperature due to engine heat or atmospheric conditions, but would separate under the influence of the greater increase of temperature due to radiation from the lighter.

Instead of the cut-out being in the form of a separate fitting for use with existing lighters, as above described, it may be combined with the lighter as a self-contained unit. Thus, the thermostats would be located in a recess in the back of the base plate of the lighter, the main thermostat being connected to a bridge or plate carrying one contact of the main controlling switch of the lighter, and the

contact point on the compensating thermostat being connected through the bow spring to one of the terminals on the base plate.

It is within the scope of the invention to dispense with the compensating thermostat, if desired, and to employ a single thermostat controlling the make-and-break contacts, said thermostat being influenced by the heating effect of the current passing through it, or by radiation from the resistance filament, or by both the current and the radiated heat.

Dated this 30th day of May, 1927.

H. N. & W. S. SKERRETT,
24, Temple Row, Birmingham,
Agents for Applicants.

COMPLETE SPECIFICATION.

Improvements relating to Electric Cigar, Cigarette and like Lighters.

We, S. SMITH AND SONS (MOTOR ACCESSORIES) LIMITED, a company registered under the laws of Great Britain, of Central Works, Edgware Road, Cricklewood, London, N.W. 2, FREDERICK WILLIAM MILLER, British subject, and FREDERICK MILLER, British subject, both of 68, Nansen Road, Sparkhill, Birmingham, and also both of "Hazeldell", Aylesbury Road, Hockley Heath, Warwickshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to electric cigar, cigarette, pipe and like lighters of the resistance type, such as are used in motor-cars and other vehicles or in other places for the convenience of smokers.

With lighters of the above type, if the switch is held closed for too long, the high resistance wire or filament becomes unduly heated and fuses, thus putting the lighter out of action.

The object of the present invention is to obviate this disadvantage appertaining to resistance lighters, and to provide, in conjunction with the lighter, an automatic cut-out or protective device which will prevent the fusing of the resistance wire and which may be arranged to maintain the lighter at a substantially uniform glowing temperature no matter how long the switch may remain closed.

According to the invention, a thermostatically-controlled switch or make-and-break device is included in the lighter circuit, the controlling thermostat being

arranged to be influenced by the heating effect of the current flowing or by the temperature of the heater so as to break the circuit before the fusing temperature of the resistance wire is reached. Conveniently the current flows through the thermostat, which carries or operates a switch contact in the circuit, so that it is heated by the current and breaks the circuit. As the thermostat cools it again closes the circuit and so long as the lighter switch remains closed, the thermostat repeatedly opens and closes the circuit, thereby avoiding overheating of the resistance wire, which, in this manner, may be arranged to be maintained at a substantially uniform, or at a variable, glow, as desired. Preferably, a second thermostat element is employed to compensate for the effect of variations in the temperature of the atmosphere in which the main or controlling thermostat is situated due to external influences, such as the heat of the engine or climatic conditions. Without this compensating thermostat variations in the temperature of the surrounding atmosphere, due to causes other than the temperature of the heater, would possibly influence the main thermostat element and cause the circuit to be opened when the lighter was not in use, or cause the contact to be opened too far when the current flowed through the said element. The said compensating thermostat is arranged to carry the contact with which the contact controlled by the main thermostat co-operates, and is influenced by external temperature conditions to the same extent as the main

thermostat, so that any variation in such temperature conditions will affect both contacts equally.

Figure 1 of the accompanying drawings is an elevation of a cut-out device according to the present invention, the casing or cover being shown in section.

Figure 2 is a vertical section through the cut-out on line 2—2, Figure 1.

10 Figure 3 is a horizontal section on line 3—3, Figure 1.

Figure 4 is a vertical section, partly in elevation, showing the cut-out combined with an electric lighter as a self-contained unit.

15 Figure 5 is a rear elevation of the said lighter showing the cut-out fitted thereto.

Figure 6 is a horizontal section through the base of the lighter.

20 Referring to Figures 1 to 3 of the drawings, showing the invention in a form suitable for use with an existing lighter, the cut-out device comprises two parallel bi-metallic thermo-

25 static strips 1, 2, preferably composed of nickel and brass, the strip 1 constituting a main controlling thermostat and the other 2 functioning as a compensating thermostat, as hereinafter described. These strips 1, 2, are fixed at one end to suitable metallic studs or posts 3, 4, secured upon a base plate 5 of insulating material and the stud or post 3 carrying the main thermostatic strip 1 is

30 connected by a suitable conductor 6 to a terminal 7 on the said base plate said terminal being adapted to be connected in the electric circuit of the lighter. The said strip 1 carries at its free end a contact point 8 of any suitable material, such as nickel, and this contact point normally engages a similar contact point 9 carried upon the free end of the other or compensating strip 2. The said free end of

35 this latter strip is riveted or otherwise directly connected to one end of a light flexible bow spring 10, the other end of which is fixed to a conducting strip or bar 11 connected to a second terminal 12 on the base plate, the said terminal 12 being connected in the lighter circuit.

40 The bow spring 10 acts as a flexible conductor for the current and also assists normally to maintain the contact points 8, 9, together.

45 When the lighter switch is closed the current flows from the terminal 7 through the main thermostatic strip 1, traverses the closed contact points 8, 9, and passes through the bow spring 10 and conducting bar 11 to the other terminal 12. The said main thermostatic strip 1 is made of such a resistance that when the resistance filament of the lighter attains a bright red glow, and before the fusing point of the

said filament is reached, the heating effect of the current passing through the strip causes the latter to deflect away from the compensating strip 2 and the contact points 8, 9, to separate, thus breaking the circuit. The main strip 1 thus commences to cool and returns to its former position,

50 the contact points coming together and (if the main lighter switch remains closed) again completing the circuit, the operation being repeated so long as the said main lighter switch remains closed.

It can be arranged for the interval between the breaking and re-closing of the circuit to be very short so that the lighter will

55 be maintained at a substantially uniform glow, or the interval can be longer so that the lighter will alternately glow and cool.

The cut-out may be enclosed by a detachable cover 13 suitably secured to the base plate.

60 The compensating thermostatic strip 2 has a similar deflection characteristic to the main strip 1, so that if the temperature of the surrounding atmosphere varies, due to the heat of the engine or by reason of climatic conditions, both the said compensating strip 2 and the main thermostatic strip 1, will move together and to the same extent, so that the contact points 8, 9, will remain closed until a current passes through the main strip. Thus the opening of the circuit is dependent solely

65 upon the heating effect of the current. In a modification, however, it may be arranged for the circuit-controlling thermostatic element to be placed close to the resistance filament so as to be influenced by the heat radiated theretrom in

70 order to open the circuit before the fusing point of the filament is reached. In this case, however, the compensating thermostat, while moving in the same direction, would have a different deflection

75 characteristic from the main thermostat, so that the contacts would remain together during small variations in temperature due to engine heat or atmospheric conditions, but would separate

80 under the influence of the greater increase of temperature due to radiation from the lighter.

85 Instead of the cut-out being in the form of a separate fitting for use with existing lighters, as above described, it may as

90 shown in Figures 4 to 6, be combined with the lighter as a self-contained unit.

In this arrangement thermostats 1, 2, are located in a recess 14 in the back of the

95 base plate 15 of the lighter, the main thermostat 1 carrying the contact 8 being connected by a bar 16 to a bridge or plate

100 17 carrying one contact 18 of the main controlling switch 19 of the lighter, and

105 the other contact 18 being connected to the terminal 7.

110 The base plate 15 is provided with a recess 20 in the front face, the cover 13 being

115 secured to the base plate 15 by means of a screw 21.

120 The cover 13 is provided with a recess 22 in the top surface, the terminals 7 and 12 being

125 secured to the cover 13 by means of a screw 23.

130 The cover 13 is provided with a recess 24 in the bottom surface, the terminals 7 and 12 being

the contact point 9 on the compensating thermostat 2 being connected through the bow spring 10 and bar 20 to a terminal 21 on the base plate. In the construction of 5 the lighter shown in the drawings, but which, apart from the cut-out, forms no part of the present invention, the other terminal 22 (Figure 5) for connecting to the battery is in electrical connection with 10 a metal rim or flange 23 engaging a metal ring 24 on a detachable front portion 25 carrying the resistance filament 26 which is connected to a stud 27 engaging a contact 28 on the spring switch arm 19, 15 which carries a contact 29 adapted, when the arm is pressed rearwards, to engage the contact stud 18 on the bridge 17, so completing the circuit.

It is within the scope of the invention 20 to dispense with the compensating thermostat, if desired, and to employ a single thermostat controlling the make-and-break contacts, said thermostat being influenced by the heating effect of the 25 current passing through it, or by radiation from the resistance filament, or by both the current and the radiator heat.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A cut-out device for use in connection with an electric cigar, cigarette or like 35 lighter comprising a thermostatically-controlled switch or make-and-break device adapted to be included in the lighter circuit.

2. A cut-out device for use with an 40 electric cigar, cigarette or like lighter as claimed in Claim 1, wherein the controlling thermostat is adapted to be traversed by the electric current flowing through the resistance of the lighter, so as to be 45 influenced by the heating effect of the said current.

3. A cut-out device for use with an 50 electric cigar, cigarette or like lighter as claimed in Claim 1 or 2, wherein the controlling thermostat is adapted to be influenced by the heat from the resistance of the lighter.

4. A cut-out device for use with an 55 electric cigar, cigarette or like lighter as claimed in any one of the preceding claims, wherein the controlling thermostat

comprises a bi-metallic strip fixed at one end and carrying or operating a switch contact in the lighter circuit, substantially as described.

5. A cut-out device for use with an 60 electric cigar, cigarette or like lighter as claimed in any one of the preceding claims, having in combination with a main controlling thermostat arranged to break the circuit, a compensating thermostat element carrying the contact with which the contact controlled by the main thermostat co-operates and adapted, under the influence of variations in the temperature of the atmosphere due to external conditions, to move its said contact in the same direction as the contact controlled by the main thermostat moves, substantially as and for the purposes herein described.

6. A cut-out device for use with an 65 electric cigar, cigarette or like lighter as claimed in Claim 5, wherein the compensating thermostat element consists of a bi-metallic strip fixed at one end and arranged substantially parallel to a bi-metallic strip constituting the main controlling thermostat, the two strips carrying co-operating contacts at their free ends, substantially as described.

7. A cut-out device for use with an 70 electric cigar, cigarette or like lighter as claimed in Claim 6 or 7, wherein the contact on the compensating thermostat is connected in the circuit of the lighter through the medium of a flexible spring conductor attached to the said thermostat, substantially as described.

8. A cut-out device for use with an 75 electric cigar, cigarette or like lighter as claimed in any one of the preceding claims, and mounted upon the base of the lighter itself so as to form a self-contained unit, substantially as described.

9. A cut-out device for use with an 80 electric cigar, cigarette or like lighter, substantially as herein described and set forth in Figures 4 to 3 of the drawings.

10. A cut-out device combined with an 85 electric cigar, cigarette or like lighter, substantially as herein described and set forth in Figures 4 to 6 of the drawings.

Dated this 1st day of June, 1927,

H. N. & W. S. SKERRETT,
24, Temple Row, Birmingham,
Agents for the Applicants.

Bills of Sale

No. 27

ERNEST J. LAENDRY,

Know all men by these Presents, That
us Trustee and Mortgagee of Central Stamping Company

of the CITY of Detroit in the County of Wayne and State of Michigan, part of the first part, for and in consideration of the sum of One and no 100th other valuable consideration Dollars, lawful money of the United States, his paid by S. J. JESSOP

part of the second part, the receipt whereof is hereby acknowledged, ha bargained and sold, and by these presents do grant and convey, unto the said part of the second part, ALL OF THE ~~RIGHTS~~ ^{his} administrators of the following goods and chattels, to wit: ~~RIGHTS~~ ^{his} machinery, furniture, equipment and all material of every description including office furniture and equipment and all accounts receivable and any other assets of any description

ERNEST J. LAENDRY,
Trustee and Mortgagee of said Central Stamping Company
his 2182 East Turner Street,
City of Detroit, Michigan

To Have and to Hold the same unto the said part of the second part, his executors, administrators and assigns, forever. And the said part of the first part, his heirs, executors and administrators, do ^{as} covenant and agree to and with the said part of the second part, his executors, administrators and assigns, to Warrant and Defend the ^{same} hereby made in said property, goods and chattels, unto the said part of the second part, executors, administrators and assigns, against all and every person or persons whatsoever.

In Witness Whereof, the said part of the first part, his executors, administrators and assigns, seal this 27th day of December, A. D. 19

Signed, Sealed and Delivered in Presence of

Tellie Surveyor Ernest Laendry [L.S.]
Gail A. Atkins Trustee & Mortgagee [L.S.]
Central Stamping Co. of Mich. Corp. [L.S.]

STATE OF MICHIGAN,
County of Wayne ss.

being duly sworn, deposes and says that he is the vendor, named in the within bill of sale, that he has knowledge of the facts, and that the consideration of said instrument was actual and adequate, and that the same was given in good faith for the purposes therein set forth.

Subscribed and sworn to before me this

21st day of

December 1926

Gail A. Reiner

Notary Public, Wayne County, Michigan.

My commission expires January 14, 1927

"Insert "is" or "is one of" or "he makes this affidavit for."

BILL OF SALE

ERNEST J. LANDRY, as
Trustee and Mortgagee of
CEN TRAIL STAMPING COMPANY

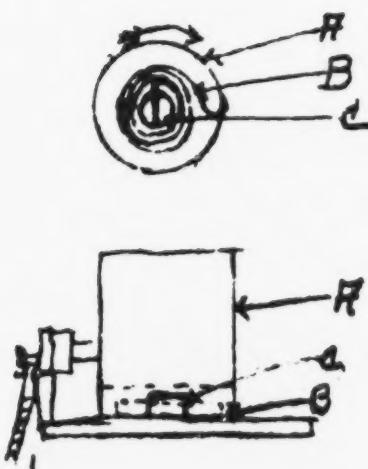
TO

S. J. JESSOP

Filed this _____
day of _____ A. D. 19_____
at _____ o'clock M.

FILED

PLAINTIFF'S EXHIBIT No. 32

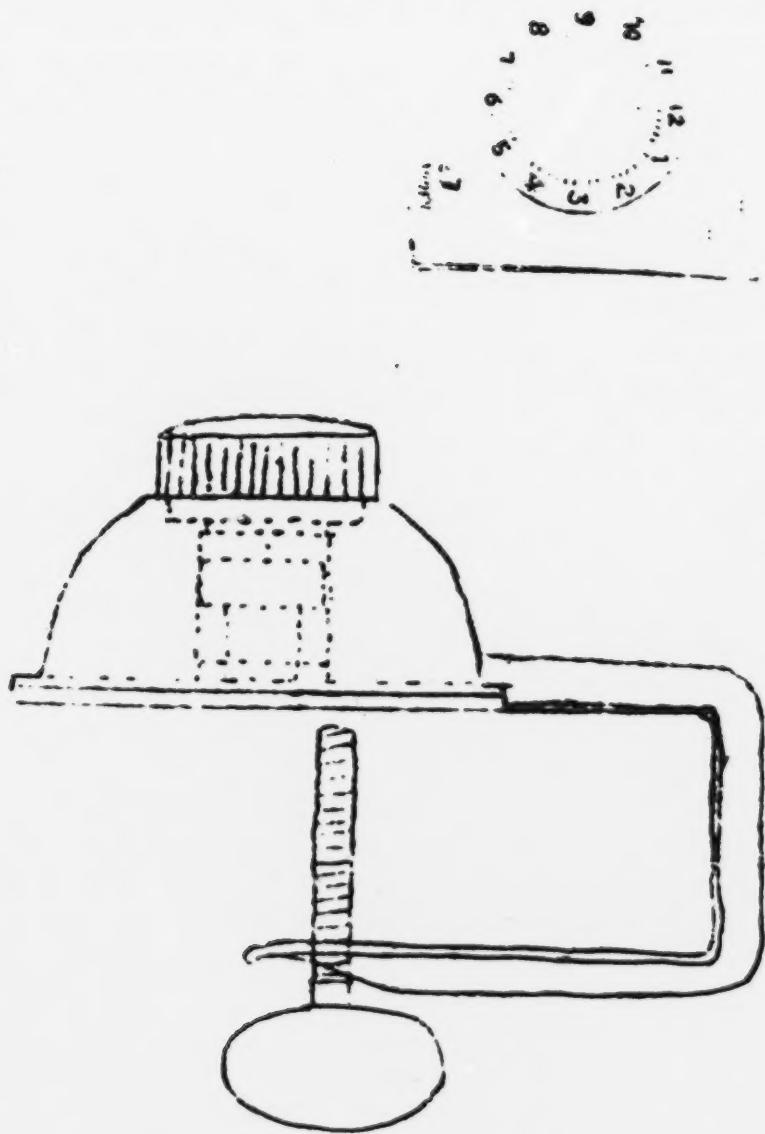


As the socket "A" is turned to right, the tension spring "B" is drawn tightly around stationary nut head "C" and locked by catch. When the spring "B" starts to expand the tension becomes greater until it builds up enough power to pull the socket off catch.

Would rather not use phosphor bronze compensator spring, but if it is necessary it will act about the same as the spring on a squibber. It will expand inside the thermostatic spring, and thereby keep a constant tension on the thermostatic metal. This metal does not seem to have the life that phosphor bronze does, and also has a tendency to stretch. Ask the patent attorney if this part can not be covered temporarily until the exact design, and gauge of metal is decided upon.

O'neer.

32/2



Falling sketch of complete
fig. 12.

391

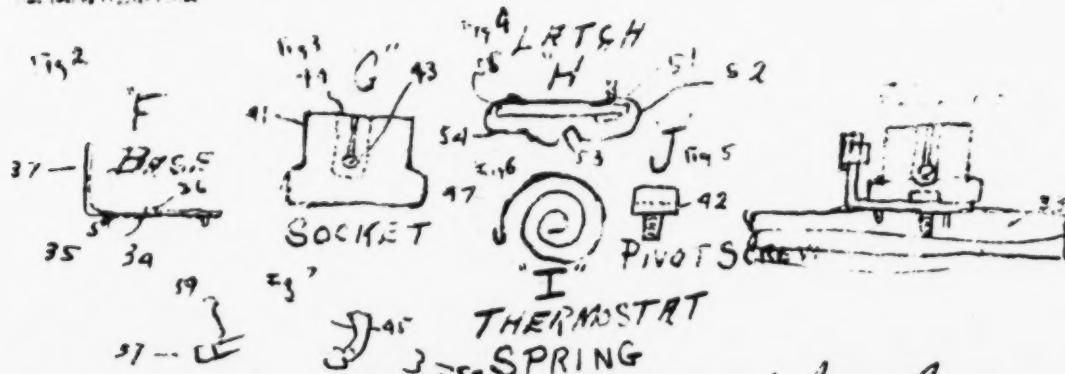


THE CENTRAL STAMPING CO.

RED CAP PH-1000C13

2182 LARNED STREET EAST
DETROIT, MICHIGAN

TELE # 1477948
SUN 10:00 AM - 3:00



3-^{ss} SPRING

Mechanical features of socket & release const:

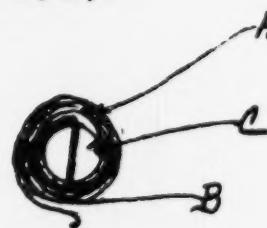
"F" Stamped & formed of brass. One lug - formed up to fit in slot in base of socket "G" to set at st. p. Two lugs formed down to anchor base "F" to fibre base. One hole punched in center for Pivot screw "J". One section of sole formed up for retaining latch "H".

"G" Locket: Close fat bottom with hole for hinge at top
center for pivot screw "J". Open at top. Enclosure
opening punched on one side for catch pin "E". Slot
on opposite side to fit compound portion of shelf "B".
Bulged at bottom to permit thermostatic lifting "I".

S. T. CESSOP CO., INC.

Received Aug 11, 1927

We are attaching hereto sketch of plain
 thermostatic coil spring which will ^{and} ~~not~~ effect
 effecting release. The catch is constructed
 of thermostatic metal to act as an added
 safety measure should the ~~constant~~ action
 of coil not be sufficient to release before
 heating element in plug would burn out.
 One thermostatic spring is fastened at bottom
 of socket directly under heating element or
 plug the action being governed by amount of
 heat passing thru coil.



- "A" - Coil spring of thermostatic metal
- "B" - Inner coil spring of Foster Bunge metal
to maintain constant outward tension on
thermostatic spring A.
- "C" - Pivot screw mounted with slotted head.

to operate.

"H" Latch or Hatch. ^{osphor} after Bronze formed and riveted to piece of fiber.

"I" Thermostatic Spring. Coiled of thermostatic metal.

"J" Pivot Screw. Special screw with slotted head to permit anchoring end of thermostatic spring "I".
Assembly.

Latch "H" secured to upright part of Base "F" and insulated; Pivot screw "J" passes thru socket "G" and Base "F" and fiber base and secured into metal clamp. Thermostatic spring "I" fastened in place one end in slot in Pivot screw "J" and other end to socket "G". This completes assembly except attaching outer cover.

These sketches and instructions are very sketchy, but they may be of use to your patent attorney in drawing his claims.

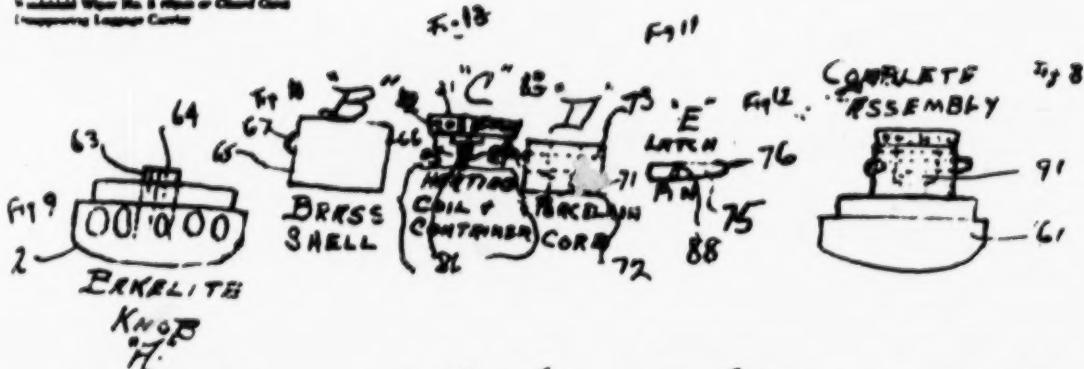
H. B. M.

AUG 6 '27

BED CAMP PRODUCTS

- 1. Auto Cover (Chamfered)
- 2. Auto Coffee Holder (Chamfered)
- 3. Auto Boxes (Piano and Chamfered)
- 4. Serving Food Boxes (Piano)
- 5. Park and Traveling Suitcases (Piano)
- 6. Washboard Wiper No. 1 (Piano or Chamfered)
- 7. Washboard Wiper No. 2 (Piano or Chamfered)
- 8. Washboard Wiper No. 3 (Piano or Chamfered)
- 9. Supporting Lampster Covers

THE CENTRAL STAMPING CO.

2102 LAKEWOOD STREET EAST
DETROIT, MICHIGANTELEPHONE
GRANDWOOD 2-2222

Mechanical features of lighter construction:

A-Bakelite knot with $\frac{1}{8}$ eye $\times \frac{1}{8}$ " long brass pin molded in center. Brass pin slotted, tapered thru center.

B-Stamped Diacon Brass shell open at top and closed on bottom with $\frac{1}{8}$ eye hole punched on bottom to fit over square pin in part A. Clearance hole punched in one side of pin to act as a diode.

C-Heating Coil Container: Stamped, formed brass, perforated on sole with 2 slots for inserting end of coil thru for ground connection. Clearance hole in bottom for 3-56 screw. Nut being screwed up on 3-56 screw against bottom of C making replaceable unit.

D-Porcelain Core: Made of porcelain to fit inside of shell D with $\frac{1}{4}$ " square hole in bottom to fit over square pin in Bakelite knot F. Round hole approx $\frac{1}{8}$ " dia at right angle to square hole, for latch pin E.

E-Latch Pin: Brass pin approx $\frac{1}{16}$ " dia $\frac{3}{4}$ " long tapered and rounded at one end and tapered thru center 3-56 for positive connection on coil assembly:

Insert porcelain core "D" in Brass Shell "B" set $\frac{1}{4}$ " Holes square brass pin in Bakelite knot. Screw in place with 4-36 Binder head screw thru hole in center of porcelain going into square pin. Insert Brass latch pin E in hole in side of porcelain core with taper end out. Screw unit C into place by 3-56 screw into 3-56 tapered hole in latch pin E. The Brass shell "B" should be $\frac{1}{2}$ " longer than porcelain core "D" so that the edges of outer wall on heating unit C will wedge lightly on inside of shell D when screwed down in place. This makes a simple, cheap, construction, and very part replaceable. This is important, especially in the case of heating unit C as they burn out in time, and are sold at .50 each.

396

PLAINTIFF'S EXHIBIT No. 34

THE CENTRAL STAMPING CO.

(INCORPORATED)

No. 6068-A
N^o. 72300

2132 LARNED STREET EAST

DETROIT, MICHIGAN August 6th, 1926

SOLD TO S.T. Jessop Co. Inc.,
Chicago, Ill.

YOUR ORDER NO.

TERMS Reg.

VIA

To special Dies, Tools and Fixtures for Two-in-One Button:

1 Spinning Tool for Shells	\$35.00	60.00
1-Horn Die for handle hole in shell	25.00	45.00
1 Blanking Die for swift BBG968	30.00	50.00
1 Forming Die for BBG968	125.00	150.00
1 Blanking Die for Fibre Bases	50.00	70.00
1 " " " Insulators	20.00	35.00
2 Gang Forming Tools & Holder for Nuts	12.00	18.00
1-Gang Cut-off Tool Holder	8.00	10.00
1 Milling Fixture for milling slot in nuts	16.00	25.00
1-Straight Shank Drill Holder for 35/64" Drill	2.00	2.00
2- " Drills, high speed, 35/64"	10.00	15.00
1-3/8" High Speed convex Milling Cutter	12.00	18.00
1-Special High Speed cutter for making Form. Tool	18.00	22.00
6 5/8" - 16 Special taps	18.00	22.00
6 5/8" - 18 special taps	24.00	35.00
2 Dies for Forming Rivets		617.00

THE CENTRAL STAMPING CO.

(INCORPORATED)

No. 6068-A Cont'd
N^o. 72300

2132 LARNED STREET EAST

DETROIT, MICHIGAN August 6th, 1926

SOLD TO S.T. Jessop Co. Inc.,
Chicago, Ill.

YOUR ORDER NO.

TERMS

VIA

Page Two

1-Rivet Forming Die for contact Assembly	25.00	18.00
1-Wire Stripping machine complete with 1/4 H.P. Motor	60.00	35.00
3-Pairs Assembling Pliers	3.00	3.00
1-Final Assembly Bench Fixture	45.00	20.00
	71.00	63.00
	183.00	149.00
		\$496.00

1-Blanking Die for Contact Points

24.75

\$330.75

PAID
AUG - 11 1926
[Handwritten Signature]

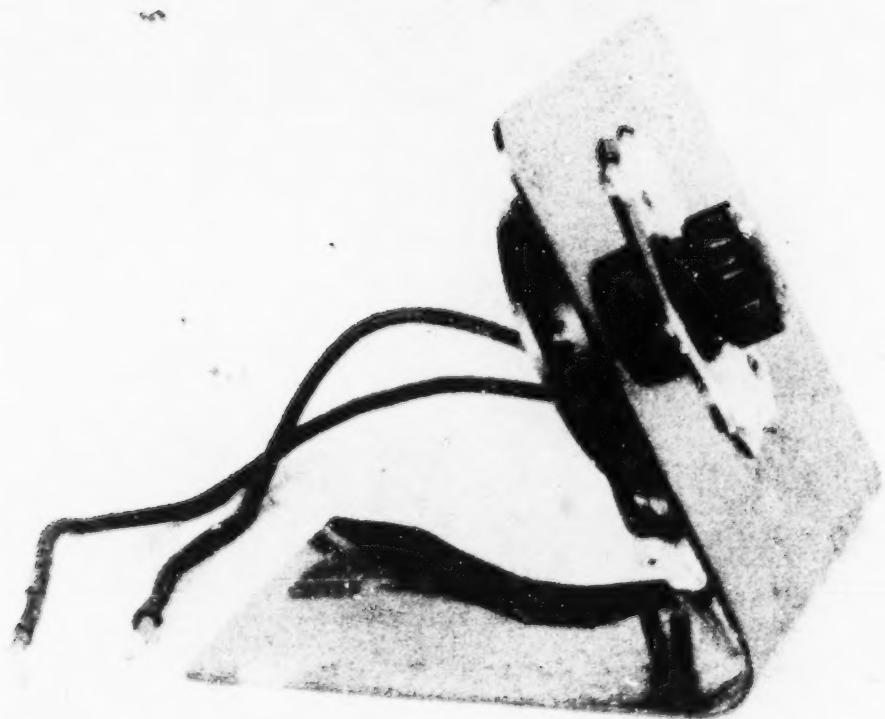
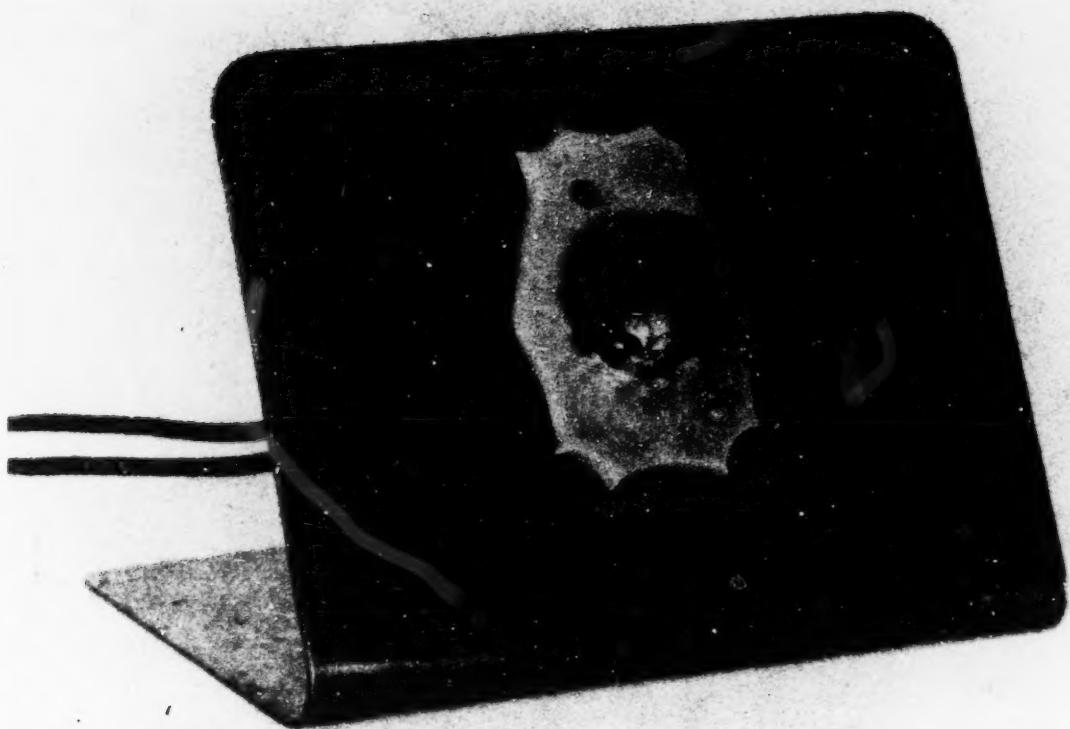
MONTGOMERY WARD & CO.

CHICAGO

Catalogue Number 109

Fall and Winter 1928-29





[fol. 401] PLAINTIFF'S EXHIBIT No. 39

Shipments of Jesco Automatch—As Indicated by Invoices
of S. T. Jessop Company, Inc.

Invoice Number	Date	Customer	Number	Amount
2579	Jan. 19, 1928	L. F. Pierson	1	\$1.60
2618	Feb. 6, 1928	Fall River Auto Supply Co.	6	9.60
2619	Feb. 6, 1928	Dave's Auto Accessory	12	21.00
2620	Feb. 6, 1928	The Rubber Store	12	19.20
2622	Feb. 6, 1928	Milburn & Kreft	1	1.60
2635	Feb. 6, 1928	Auto & Aero Supply Co.	2	3.50
2636	Feb. 6, 1928	Norman Baughman Co.	1	1.60
2637	Feb. 6, 1928	General Motors Supply Co.	1	1.60
2638	Feb. 6, 1928	W. C. Landon & Co., Inc.	1	1.60
2647	Feb. 10, 1928	Ritter's	4	7.00
2649	Feb. 9, 1928	W. Fred Pierson	1	1.60
2650	Feb. 9, 1928	Guarantee Tire & Rubber Co.	12	21.00
2652	Feb. 10, 1928	Western Auto Supply Co.	1	1.75
2653	Feb. 10, 1928	Gamble Stores, Inc.	1	1.75
2654	Feb. 10, 1928	Western Auto Supply Co.	1	1.75
2655	Feb. 10, 1928	Hanson Duluth Co.	1	1.60
2656	Feb. 11, 1928	Retail Chain Stores Corp.	12	21.00
2658	Feb. 15, 1928	A. W. Kaufman	1	1.50
2659	Feb. 13, 1928	C. P. Myers	3	4.50
2660	Feb. 13, 1928	Henry's Auto Access	12	21.00
2676	Feb. 16, 1928	Van's Auto Specialty Co.	6	9.60
2697	Feb. 23, 1928	Milburn & Kreft	6	9.60
2714	Feb. 29, 1928	(Cash Sale)	4	6.40
2768	Mar. 13, 1928	Fournier Mfg. Co.	4	7.00
2794	Mar. 19, 1928	E. A. Bowman, Inc.	12	19.20
2795	Mar. 17, 1928	The T. Eaton Co.	6	10.50
2796	Mar. 17, 1928	C. P. Myers	1	1.50
2805	Mar. 20, 1928	Korte Bros.	12	19.20
2809	Mar. 22, 1928	The T. Eaton Co.	12	21.00
2819	Mar. 24, 1928	Gillespie Auto Supply Co.	1	1.75
2820	Mar. 24, 1928	C. P. Myers	2	3.00
2825	Mar. 26, 1928	Montgomery Ward & Co., Baltimore	1	1.58
2828	Mar. 26, 1928	Montgomery Ward & Co., Kansas City	1	1.58
2830	Mar. 26, 1928	Montgomery Ward & Co., St. Paul	1	1.58
2834	Mar. 26, 1928	Montgomery Ward & Co., Chicago	2	3.15
2864	Apr. 4, 1928	Sweeney Supply Stores	1	1.75
2881	Apr. 9, 1928	San Pedro Auto Supply Co.	10	16.00
2884	Apr. 10, 1928	F. J. Keller Co.	3	4.80
2885	Apr. 10, 1928	Kaplan Bros.	12	19.20
2886	Apr. 10, 1928	Leo's Auto Access	3	5.25
2893	Apr. 12, 1928	The Foster Auto Supply Co.	1	2.00
2894	Apr. 12, 1928	The Van Voorhies-Phinney Co.	1	2.00
2895	Apr. 12, 1928	Elkhart Motor Supply Co.	12	21.00
2925	Apr. 17, 1928	Pekin Leather Products Co.	2	3.60
2974	May 1, 1928	Auto Accessory Spec. Co.	12	18.90
[fol. 402]	May 1, 1928	Salzedo Garage	1	2.10
	May 3, 1928	Western Auto Supply Co.	3	4.73
	May 8, 1928	W. Fred Pierson	2	3.20

Invoice Number	Date	Customer	Number	Amount
3044	May 21, 1928	Lloyd Wynne.....	1	1.50
3062	May 28, 1928	B. Lee.....	2	3.50
3079	June 1, 1928	Fournier Mfg. Co.....	6	10.50
3085	June 8, 1928	B. R. Tolmas.....	2	3.50
3087	June 3, 1928	Lloyd Wynne.....	(2)	4.00
			(2)	4.00
3090	June 5, 1928	O'Toole & Gibbons.....	2	3.50
3092	June 6, 1928	E. M. Salzburg.....	2	3.20
3093	June 6, 1928	O. L. Erwin.....	2	3.50
3097	June 3, 1928	National Motor Products Co.....	2 ¹	37.80
3098	June 3, 1928	A. E. Steppier.....	2	3.20
3163	June 30, 1928	Montgomery Ward & Co., Portland, Ore.....	50	78.75
3171	June 30, 1928	Willey Garman Co.....	6	12.12
3174	June 30, 1928	Montgomery Ward & Co., Kansas City.....	25	39.38
3179	July 3, 1928	Montgomery Ward & Co., Chicago.....	50	78.75
3187	July 5, 1928	E. L. Jones.....	2	3.50
3191	July 5, 1928	Montgomery Ward & Co., Oakland.....	150	236.25
3199	July 7, 1928	National Motor Products.....	12	24.30
3206	July 9, 1928	F. H. Lichtenwalter & Co.....	(2)	4.05
			(2)	3.15
3207	July 11, 1928	W. Jones.....	2	3.50
3228	June 30, 1928	Montgomery Ward & Co., St. Paul.....	10	15.75
3229	July 18, 1928	Montgomery Ward & Co., Baltimore.....	100	157.50
3250	July 25, 1928	Montgomery Ward & Co., Baltimore.....	100	157.50
3282	Aug. 3, 1928	Adam Kaufman.....	(2)	3.00
			(2)	3.00
3299	Aug. 7, 1928	Montgomery Ward & Co., St. Paul.....	30	47.25
3301	Aug. 7, 1928	Fournier Mfg. Co.....	6	10.50
3314	Aug. 11, 1928	Montgomery Ward & Co., St. Paul.....	6	9.45
3315	Aug. 11, 1928	Montgomery Ward & Co., Kansas City.....	12	18.90
3346	Aug. 17, 1928	Trico Products Corp.....	(1)	2.02
			(1)	1.58
3356	Aug. 21, 1928	Montgomery Ward & Co., Kansas City.....	12	18.90
3393	Aug. 31, 1928	Montgomery Ward & Co., Chicago.....	50	78.75
3407	Sep. 1, 1928	W. Fred Pierson.....	(1)	1.38
			(1)	1.75
			(1)	1.75
3421	Sep. 6, 1928	Mr. Woods (Canadian Lakes Fishing).....	1	1.38
3428	Sep. 7, 1928	Chicago Auto Supply House.....	12	16.56
3429	Sep. 8, 1928	E. W. Aufderheide.....	1	1.38
3438	Sep. 10, 1928	C. B. Marlatt.....	2	3.50
3449	Sep. 10, 1928	C. A. Pearson.....	2	2.75
3493	Sep. 18, 1928	Montgomery Ward & Co., Portland, Ore.....	50	78.75
[fol. 403]	Sep. 19, 1928	Montgomery Ward & Co., Portland.....	50	78.75
	Sep. 22, 1928	National Gauge & Equipt. Co.....	2	3.00
	Sep. 28, 1928	Montgomery Ward & Co., St. Paul.....	30	47.25
	Oct. 1, 1928	Montgomery Ward & Co., Kansas City.....	20	31.50
	Oct. 8, 1928	Montgomery Ward & Co., Chicago.....	25	39.38
3637	Oct. 13, 1928	Montgomery Ward & Co., Oakland.....	(25)	39.38
			(25)	39.38
3654	Oct. 17, 1928	Montgomery Ward & Co., Portland.....	150	236.25
3674	Oct. 15, 1928	Montgomery Ward & Co., Chicago.....	25	39.38
3734	Oct. 31, 1928	(Cash Sale) M. S. Jordan.....	1	2.75
3749	Nov. 1, 1928	Montgomery Ward & Co., Kansas City.....	20	25.00

Invoice Number	Date	Customer	Number	Amount
3760	Nov. 1, 1928	Montgomery Ward & Co., Chicago.....	50	62.50
3768	Nov. 8, 1928	Mr. Hamilton (Cash Sale).....	1	1.50
3769	Nov. 3, 1928	Montgomery Ward & Co., St. Paul.....	(2)	3.16
			(1)	1.56
3779	Nov. 10, 1928	Montgomery Ward & Co., Oakland.....	300	375.00
3825	Nov. 17, 1928	C. P. Myers.....	1	1.50
3834	Nov. 23, 1928	Montgomery Ward & Co., Chicago.....	100	125.00
3843	Nov. 24, 1928	Montgomery Ward & Co., Kansas City....	20	25.00
3852	Nov. 30, 1928	Montgomery Ward & Co., Baltimore.....	50	62.50
3856	Nov. 30, 1928	Montgomery Ward & Co., St. Paul.....	15	18.75
3879	Dec. 6, 1928	Montgomery Ward & Co., Denver.....	20	25.00
3911	Dec. 15, 1928	Montgomery Ward & Co., Kansas City....	20	25.00
3939	Dec. 31, 1928	Montgomery Ward & Co., St. Paul.....	(1)	1.25
			(2 memo.)	

404
DEFENDANT'S EXHIBIT B

Automatic Devices Corp
Cres Eng Corp.
Docket #97

CASCO LIGHTER

Fig. 1.

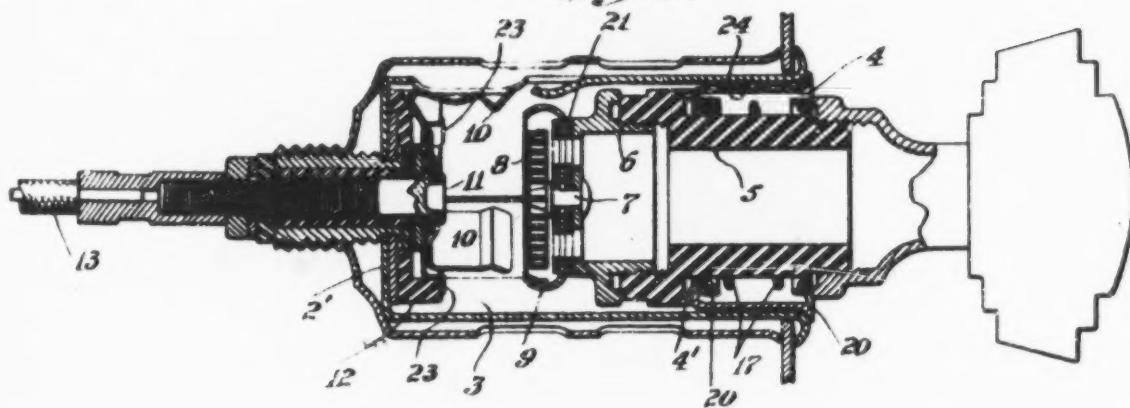
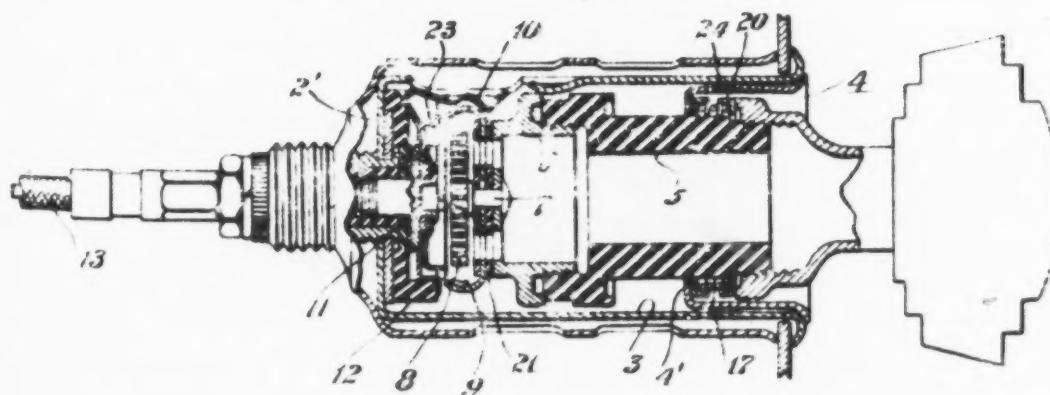


Fig. 2.



Automatic Service Corp
Cars Eng. Corp
Stock No. 97

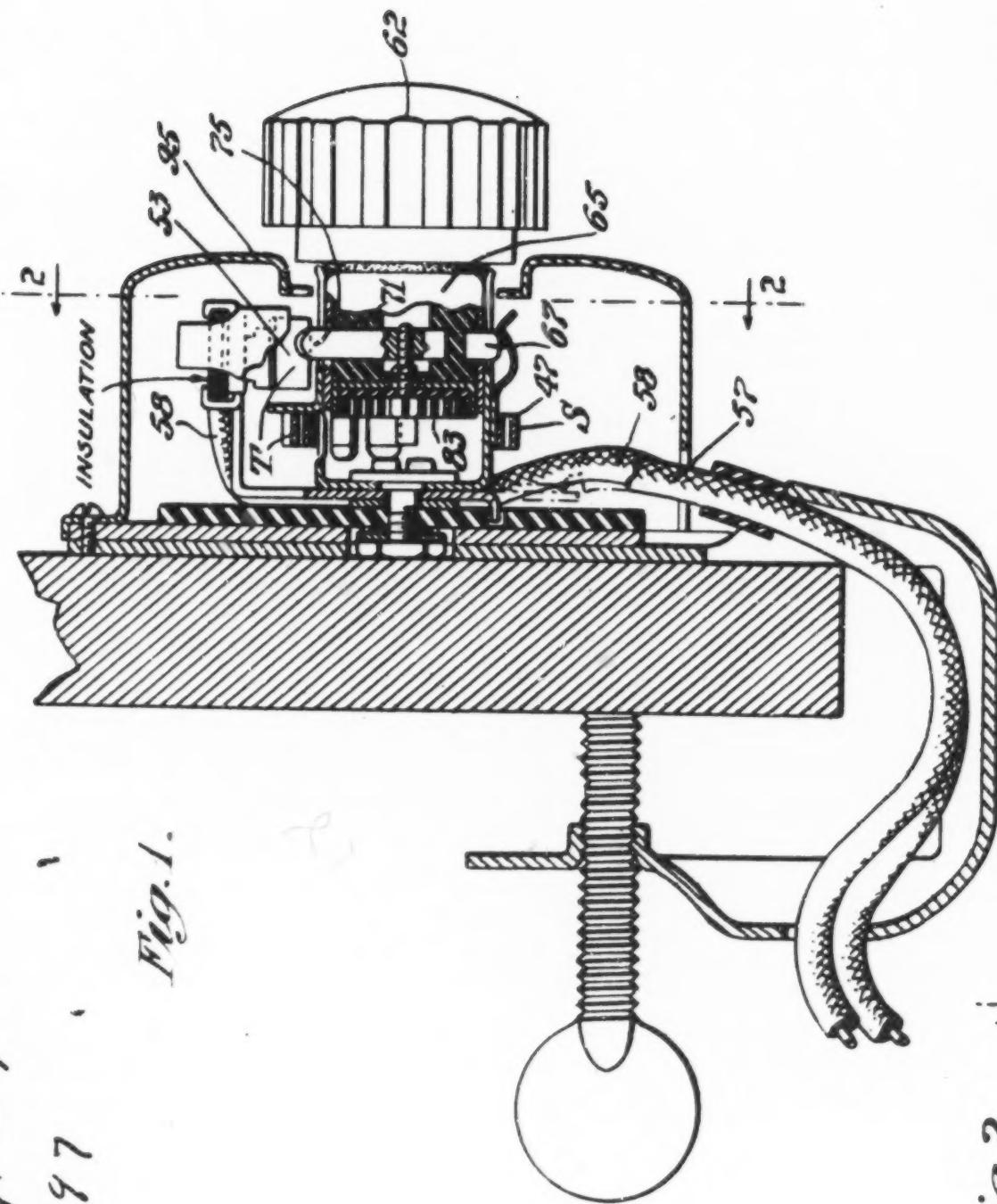
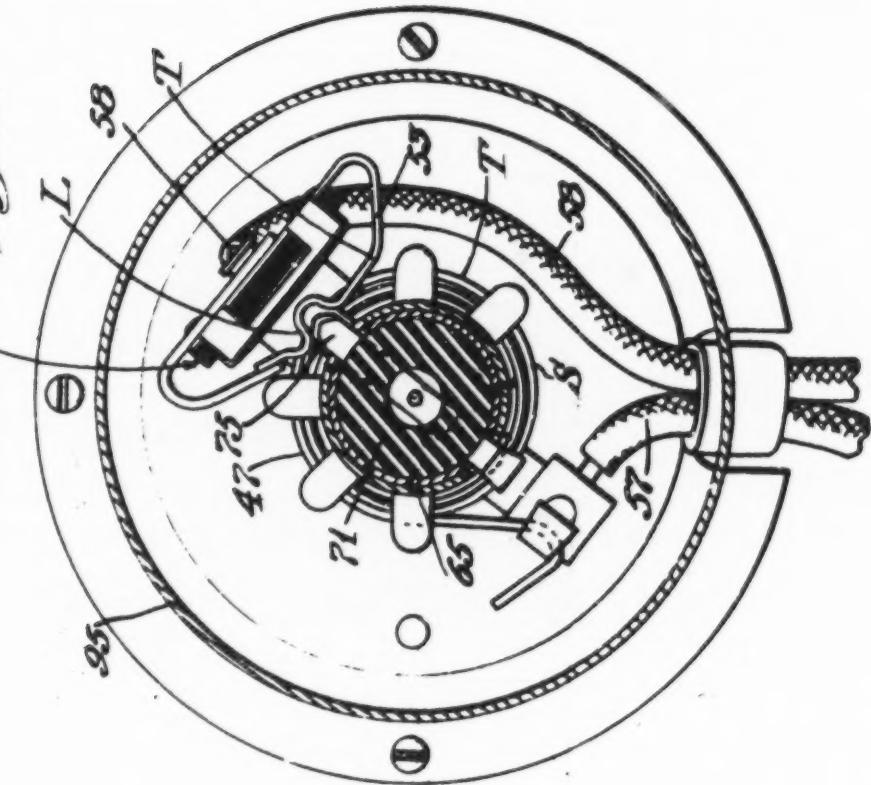
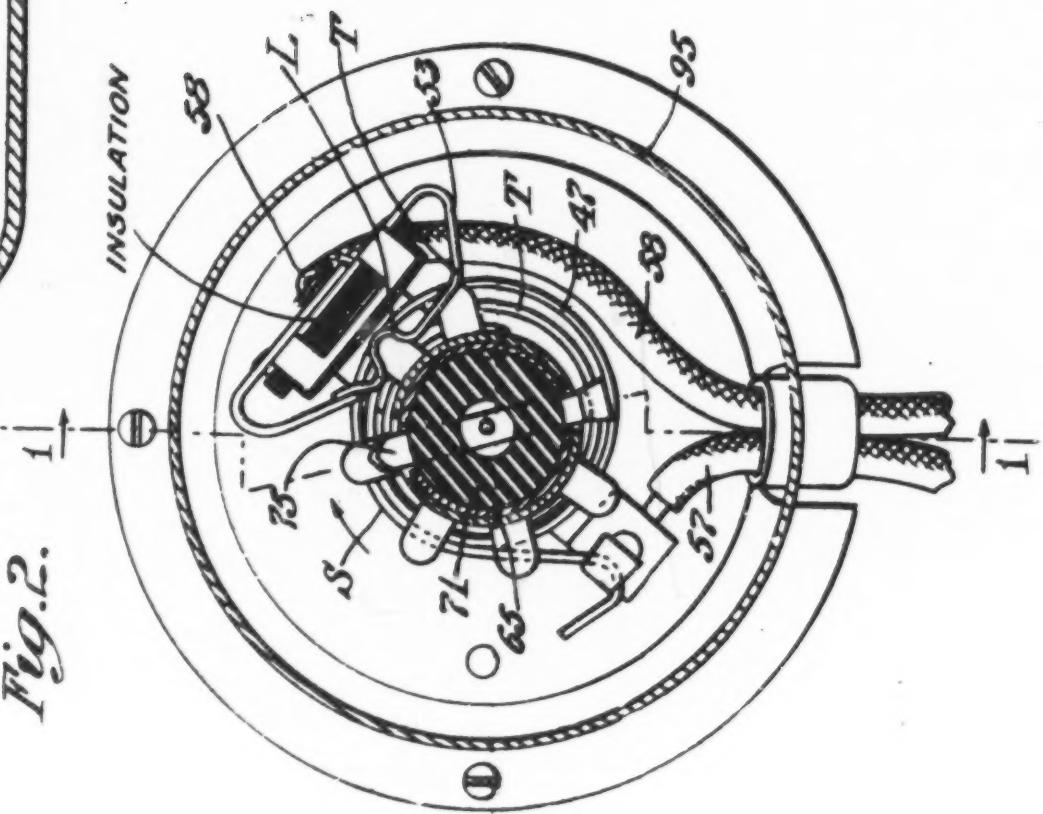


Fig. 2.
Fig. 3.



AUTOMATIC LIGHTER

EASE-EASE

\$2.50 complete
includes shipping & handling
plus tax.
These set 5 pieces to install on your car through the rear
view glass, or attached with brackets included with
each piece.

CASCO PRODUCTS CORPORATION • BRIDGEPORT, CONN.
George M. Watson Company, 187 King St., East, Toronto

- Here's a lighter that can't fail, a lighter that's never too hot, never too cold... it's thermostatically controlled. Tested for over 20,000 lights. Approved by engineers of leading automobile manufacturers. Guaranteed unconditionally. Ends fumbling... pushing... dangerous, one-hand, blind driving. A safety lighter... you keep your hands on the steering wheel, your eyes on the road and your mind on your driving. Adds to smoking pleasure. Order direct if not available at your garage or auto supply dealer. Send no money. Pay postman on delivery.

CLICK when light is ready
it signals when

JUST PRESS
do not have to hold it in
you

its automatic

A LIGHTER
THAT THINKS
FOR YOU



CASCO ADVERTISING

NATIONAL MAGAZINES AND RADIO

to help you sell the
NEW AUTOMATIC CIGAR LIGHTER



FREE DEMONSTRATOR
FREE with initial order.
Wires to Storage Battery.
Held to show case or
counter with suction
cups. Attracts customers.
Sells Lighters.

- Over 83 million advertisements... full pages in color and dominant copy ... will be carried by the leading National magazines shown in this ad. The schedule starts in April, 1937 and runs consistently through the year. Supporting this campaign, to help you sell, will be spot radio broadcasts over key stations. Every motorist who can read or hear will be influenced by Casco advertising.

CASCO PRODUCTS CORPORATION
Bridgeport, Conn.

- Installed on any car in five minutes... attached with bracket or through instrument panel. All wired ready to hook up. Bracket packaged with every lighter. Pearl Gray, Golden Brown and Ebony color selections.

DISPLAY CONTAINER
The attractive counter display pictured above (size 8½" x 14") holds 10 units. A good silent salesman... Protects against thieving.



CASCO

Automatic LIGHTER

Automatic Device Corp.

Civil Engg. Corp. Docket #872

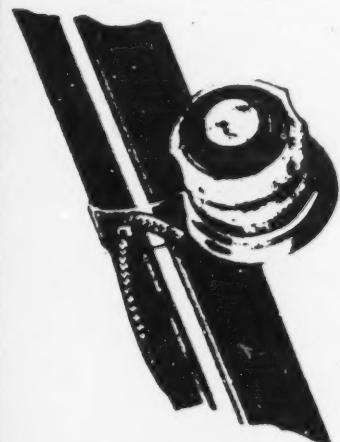
262

CASCO

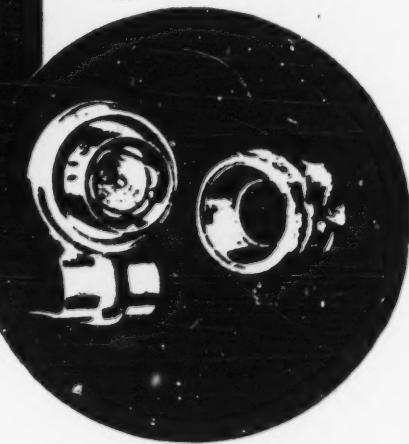
Cigar Lighters

All Lighters available in two types. Plain numbers designate Clamp-on type. Numbers with suffix "C" mount Through-Dash or on Steering Column, with bracket furnished.

Illustrations actual size



All C-type Lighters are furnished with bracket to fit on steering column. For Through-the-Dash, discard bracket, drill hole.



No. 485—ONYXOID VIS-O-LITE \$1.75

COLORS:

ONYX, ROSE QUARTZ, GREEN QUARTZ

No. 485 Clamp-on chrome metal frame	\$1.75
No. 485 C for Steering Column mounting or Through the Dash	\$1.75

REPLACEMENT PARTS FOR No. 485

Replacement Head, No. 485-29	\$1.75
Heating Element, No. 485-30	.50

THIS is a Lighter of rare beauty. The head is made of "Onyxoid" beautifully noddled and translucent. Chrome inlays add beauty and smart design. Lens reflects a red glow when unit is ready to take off for lighting.

Patented enclosed switch prevents short circuits. Special silver contacts eliminate oxidation.

Note the deep recess which holds the heating element safely from burning hands or clothing. Operates with quick, easy, positive action.

Pat. Nos. 2,710,348, 2,710,351

Other Patents Pending

All CASCO Lighters See Page 10 Will fit all cars. Suggested dealer discount 10% or more. 40% Less than 10. 50% less.

CASCO PRODUCTS CORP., Bridgeport, Conn.

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CASCO
REG U.S. PAT. OFF.

The Veterinist's
Safety Device

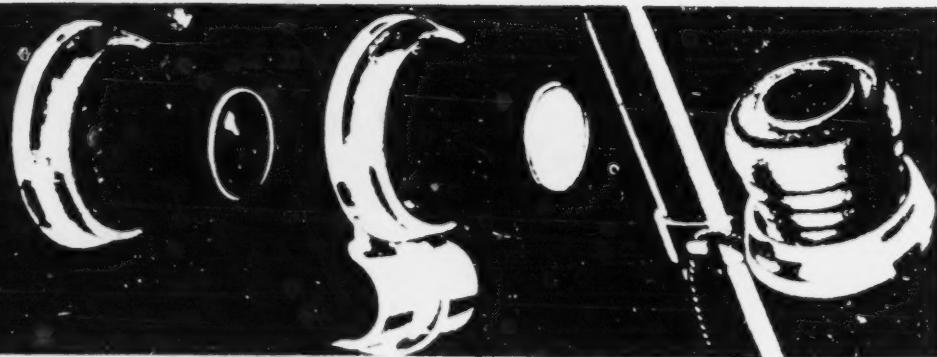
CIGAR LIGHTERS IN ATTRACTIVE COLORS



Stainless Steel
Metal Body
Available in
Silver or
Black



Stainless Steel
Metal Body
Available in
Silver or
Black



ALL THREE COLORS AVAILABLE FOR EITHER
TYPE OF BRACKET

The well-equipped cat wears

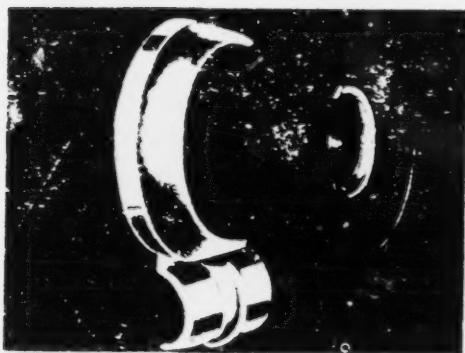
CASCO SAFETY NECESSITIES

The Motorist's
Safety Match

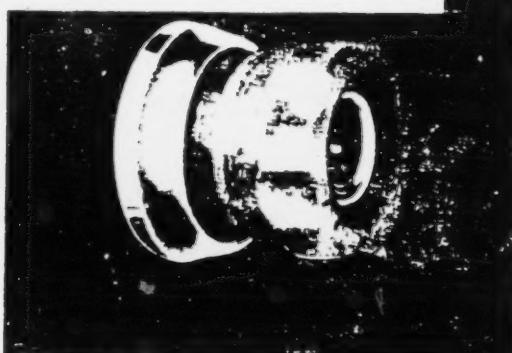
CASCO
REG. U.S. PAT. OFF.

262

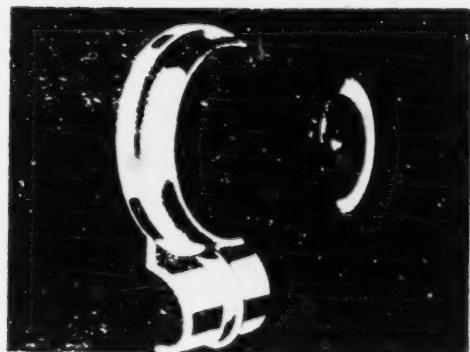
POPULAR PRICED LIGHTERS IN COLORS



SAFETY MATCH
CIGARETTE LIGHTER
IN DARK GREEN COLOR



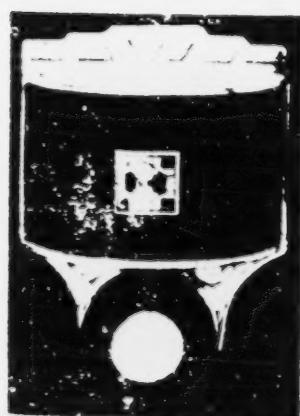
SAFETY MATCH
CIGARETTE LIGHTER
IN DARK RED COLOR



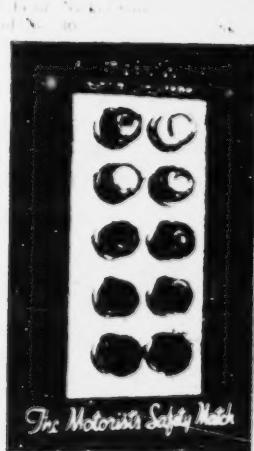
SAFETY MATCH
CIGARETTE LIGHTER



SAFETY MATCH
CIGARETTE LIGHTER
IN DARK GREEN COLOR



SAFETY MATCH
CIGARETTE LIGHTER
IN DARK RED COLOR



The Motorist's Safety Match

The well equipped car wears **CASCO** SAFETY NECESSITIES



REPLACEMENT HEATING ELEMENTS For Standard Equipment Cigar Lighters

The Casco Electric Cigarette Heater is the most popular cigarette heater in the world. It is used by millions of motorists every day. It is the standard equipment in all new cars.

This gas lighter uses the same heating element as the Casco Electric Cigarette Heater. It is made of high grade steel and is designed to fit perfectly into the cigarette holder. It is a simple matter to replace the heating element. Just remove the old one and drop in the new one.

For detailed instructions see page 10.

Now you can have the best cigarette heater in the world at a price that won't break your budget.

Order today from your local dealer or mail direct to:

CASCO PRODUCTS CORP.
Bridgeport, Conn.



The well equipped car needs

CASCO SAFETY MATCHES

262

No. 80

CASCO

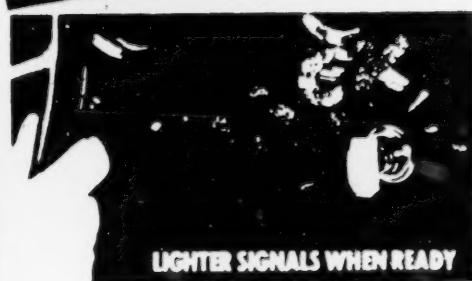
Automatic CIGAR LIGHTER

**GUARANTEES A PERFECT
LIGHT EVERY TIME**

• Here's a lighter that won't ever
burn too hot or too cold. It's the most
safely controlled. Ask your smoking friends
the Approved and Safety Officials
of manufacturers and Safety Officials



HERMOSTAT
CONTROLS HEAT
HERE'S HOW
IT WORKS



**INSTALLED IN 5 MINUTES
ON ANY CAR . . THROUGH
INSTRUMENT PANEL . . OR
ATTACHED with BRACKET**

- Replaces the old style lighter through the instrument panel. Or attached with bracket so you can sell to smokers who object to drilling holes in instrument panel. Comes wired complete ready to hook up.
- Tests prove the new Casco Automatic Lighter the fastest selling automotive accessory in years. Dealer sales helps. See next page for most 1938 cars.

© 1938 GM Printed in U.S.A.

**BRACKET
ENCLOSED
WITH EVERY
LIGHTER**



List Price \$2.50 Choice of 2 Colors
Pearl White Brown Quartz
Black Silver

Dealers Net Price 1.05 (10 or more)
50 less than 10)

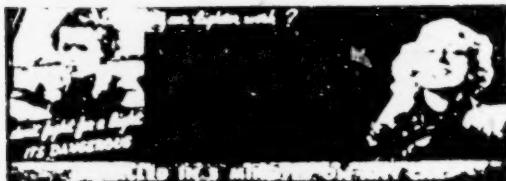
Standard Package: 10 Lighters
4 Pearl, 4 Brown, 2 Black
Shipping Weight: 4 Pounds

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CASCO

AUTOMATIC CIGAR LIGHTER

HERE ARE THE **FREE** SALES
HELPS WHICH WILL KEEP
YOUR STOCK OF LIGHTERS
MOVING.



...and light for a bright, safe DANCEHOUSE.
...and light for a bright, safe DANCEHOUSE.
...and light for a bright, safe DANCEHOUSE.

Ask Employee to Secure Free Imprinted



With w. leather in five colors, and a 25¢ card
with shell. A hot lighter has been so
designed. Effective and colorful for window or
counter use.

CASCO PRODUCTS CORP.

BRIDGEPORT, CONN.

The well equipped car wears

CASCO SAFETY NECESSITIES

CASCO

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REPLACEMENT HEATING ELEMENTS for STANDARD EQUIPMENT CIGAR LIGHTERS

THESE genuine CASCO Cigar Lighter Heating Elements are the equivalent of the well-type standard equipment cigarette lighters. These elements are made of the best and most durable materials available. They fit tightly and give maximum service.

These heating elements are used in cigarette and pipe smokers' cigarette lighters, windows, radios, lamps, and many other devices that require a reliable heating element. Replace old, worn-out, or damaged standard heating elements with these new, safe, and reliable heating elements.

For your convenience, the following list shows the serviceable standard equipment cigarette lighters they will get you a heating element. At your store, keep a copy of this list near the window display cases.

Standard equipment cigarette lighters, radios, lamps, windows, etc., can be repaired by a qualified repairman.

No. 2754 HEATING ELEMENT

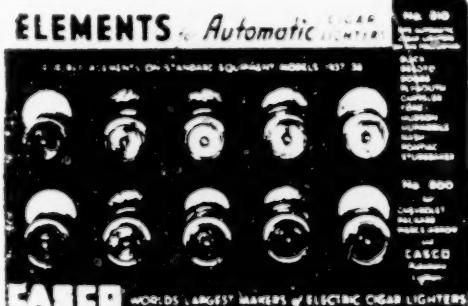
LIST

No. 49C HEATING ELEMENT

40c ea.



ELEMENT ASSORTMENT: A Selection of No. 2754 and No. 49C Heating Elements



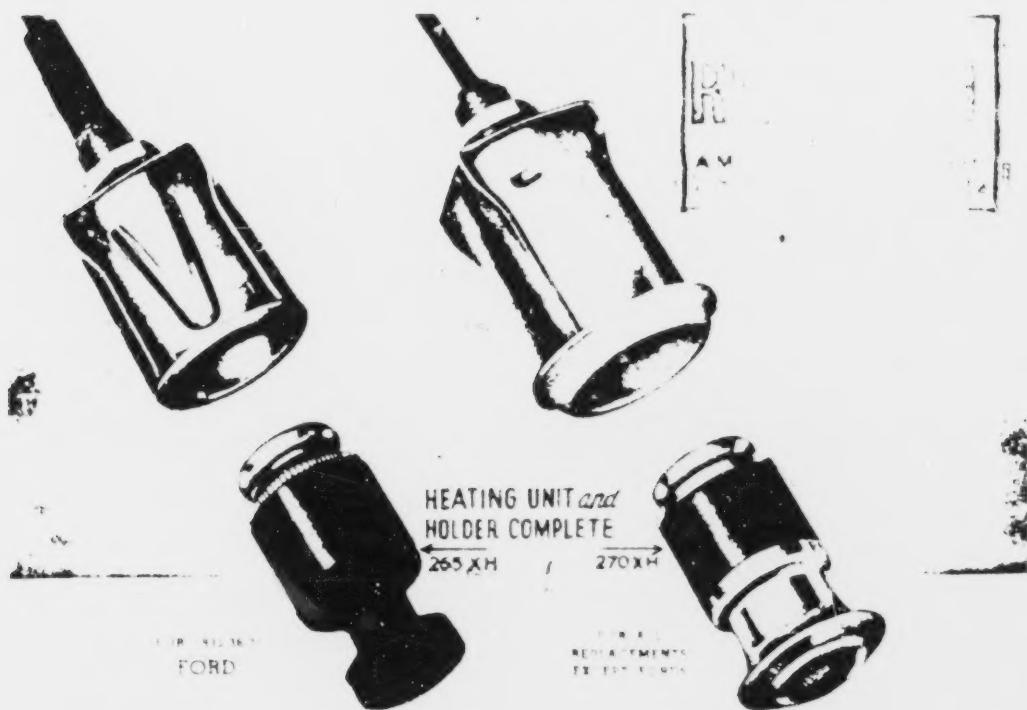
CASCO PRODUCTS CORPORATION

BRIDGEPORT, CONN.

The well equipped cat wears

CASCO SAFETY NECESSITIES

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CASCOREPLACEMENT STANDARD EQUIPMENT
CIGAR LIGHTERS

FORD
No. 265-X Ford Cigar Lighter Complete with Heating Element and Switch Base
No. 265-XH Heating Unit and Holder Complete with Heating Element
No. 265-XL Replacement Element for Ford Lighter

No. 270-X Standard Cigar Lighter Complete with Heating Element and Switch Base
No. 270-XH Heating Unit and Holder Complete with Heating Element
No. 270-XL Replacement Element for Standard Lighter

REPLACEMENT HEAD for AUTOMATIC LIGHTERS



HEATING UNIT AND
HOLDER COMPLETE IN
COPPER-KERAFIL
AND ELEMENT 1-16
PART NO. 809

The Casco Automatic Cigar Lighter is a standard heating unit with a heating element. It is designed to fit onto Casco's Automatic Lighter.

CASCO PRODUCTS CORPORATION BRIDGEPORT, CONN.

The well equipped car wears **CASCO** SAFETY NECESSITIES

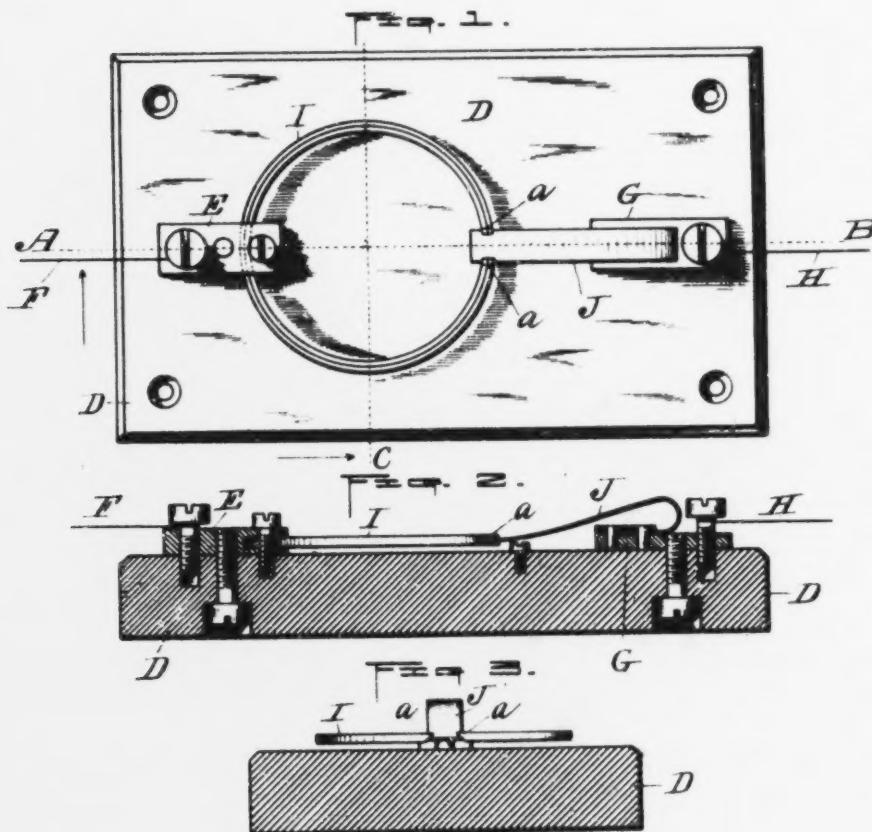
(No Model.)

E. F. HAMMARSTRÖM.

COMBINED CUT-OUT AND LIGHTNING ARRESTER.

No. 493,380.

Patented Mar. 14, 1893.



WITNESSED,
W. B. Nourse.
S. Forrest Kison

INVENTOR,
Ernst F. Hammarstrom
By Albert A. Barker, Atty

UNITED STATES PATENT OFFICE.

ERNST FREDRIK HAMMARSTRÖM, OF STOCKHOLM, SWEDEN, ASSIGNOR OF ONE-FIFTH TO AXEL JUNGMARKER, OF WORCESTER, MASSACHUSETTS.

COMBINED CUT-OUT AND LIGHTNING-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 493,380, dated March 14, 1893.

Application filed June 3, 1892. Serial No. 135,445. (No model.)

To all whom it may concern:

Be it known that I, ERNST FREDRIK HAMMARSTRÖM, a subject of the King of Sweden and Norway, residing in the city and Province of Stockholm, Sweden, have invented certain new and useful Improvements in a Combined Cut-Out and Lightning-Arrester; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a top or plan view of my improved cut-out and lightning arrester. Fig. 2 is a central, longitudinal section thereof, taken on line A. B. Fig. 1, and Fig. 3 is a transverse section taken on line C, Fig. 1.

The main object of my invention is to provide a cut-out and lightning arrester which may be tested at any time without renewal of any of the parts, which shall require renewal only at long intervals, and which shall be more sure and positive in its action than the usual cut outs and lightning arresters in which a fuse-wire is employed.

Said invention consists of an open bow-spring or ring composed of two different kinds of metal welded together and rigidly connected with a bearing on the main support, and with which bearing the main line wire is also connected; and of a light spring or latch connected with the other bearing, to which the wire communicating with the telephone or other electrical instrument connects, said spring or latch being adapted to engage at its outer end with the open ends of the aforesaid bow-spring or ring. The connection being broken through the expansion of the bow-spring or ring by an electric current of unusual power which releases the spring or latch, and by said disconnection, breaks the current without loss or injury to any of the parts.

In order that those skilled in the art to which my invention appertains may better understand the nature and purpose thereof, I will now proceed to describe it more in detail.

In the drawings, D represents the main support or back-board to which the device is secured.

E, is the bearing with which the main, line

wire F connects, and G the bearing to which is attached the wire H, which communicates with the telephone or other electrical instrument.

The bow-spring I is preferably made in the form of a split ring; that is, cut apart transversely at one point, leaving an opening between the two ends a a, a little less in distance apart than the width of the spring J, whose outer end lies horizontally between the said two ends and is there held by the slight pressure of the bow-spring at each side thereof, until such time as said bow-spring shall be expanded to release said spring.

The parts are so adjusted that the usual strength of current employed for telephone and telegraph purposes may pass through uninterrupted, not being of sufficient strength or power to expand the bow-spring a sufficient distance to release the light spring which forms the connection with the other wire; but when a strong electric current comes in contact with the main line as is frequently the case in a thunder storm, it passes along the wire and when it comes in contact with the bow-spring, the powerful current causes said bow-spring to expand and releases the spring held between the two ends of said bow-spring, when said light spring flies up out of the way, and thereby, as will at once be seen, cuts off the farther progress of said strong current. The reason for said expansion of the bow-spring is on account of its being composed of two different metals, one outside of the other, as shown in the drawings, which are in practice welded together.

The inner ring of the completed, welded ring being composed of metal which has greater expanding power under heat than the outer one, consequently causes the two ends to be forced out laterally with the result above stated.

It will be observed that to re-connect the lines, it is simply necessary to force out the bow-spring and adjust the spring or latch in position, when the device is again in readiness for operation, without renewal of any of its parts and at the expenditure of but little time or trouble. It will also be observed that the device may be tested at any time without

the cost of renewal of any of the parts, said testing operation resulting simply in the disconnecting of the parts which may be readily connected again after said testing operation,
5 as above described.

I have found in practice that the device will work with absolute certainty at a temperature much below that required for melting the usual fuse-wire in similar devices.

10 Having now described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

An improved electric cut-out, comprising in combination the main, line wire bearing E;

the expansible open ring or bow-spring I attached at a convenient point between its ends to said bearing E; the spring-latch J attached to the other line-wire bearing G and adapted to be engaged with the ends of ring I to close the circuit, said circuit being broken through 15 the expansion of said ring and release of the spring-latch by the electric current, substantially as and for the purpose set forth.

ERNST FREDRIK HAMMARSTRÖM.

Witnesses:

W. H. EDWARDS,
W. HAUPT.

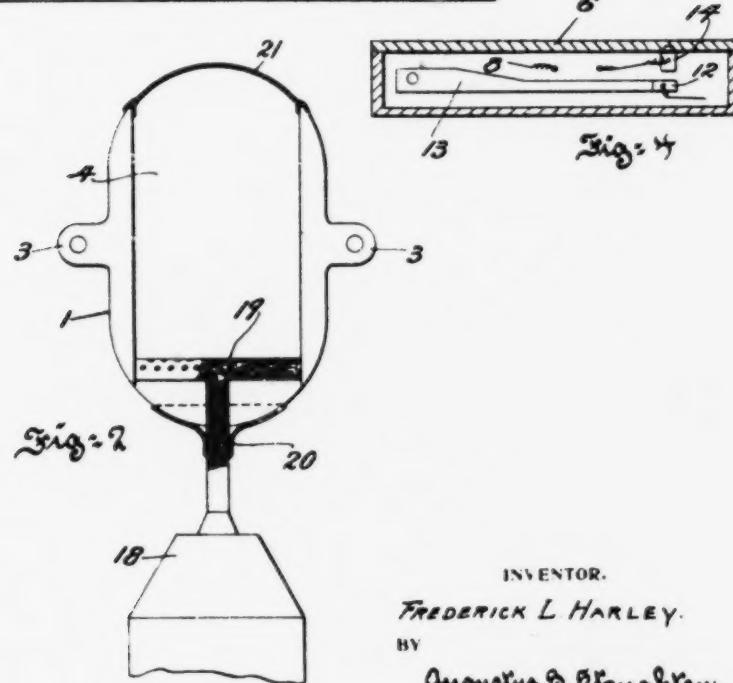
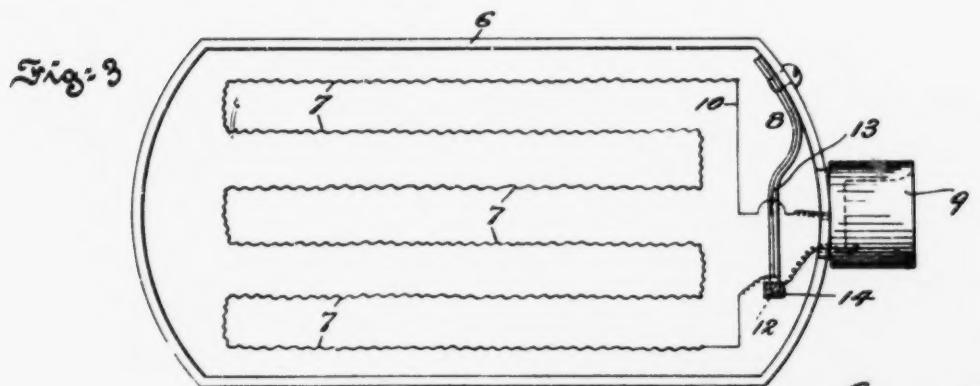
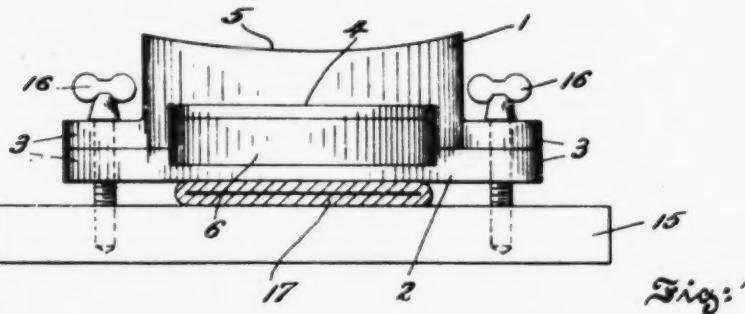
No. 852,326.

PATENTED APR. 30, 1907.

F. L. HARLEY.

APPARATUS FOR REPAIRING PNEUMATIC TIRES.

APPLICATION FILED DEO. 22, 1906.



WITNESSES.

INVENTOR.

FREDERICK L HARLEY.

BY

Augustus D. Blough, Jr.
ATTORNEY.

UNITED STATES PATENT OFFICE.

FREDERICK L. HARLEY, OF QUAKERTOWN, PENNSYLVANIA.

APPARATUS FOR REPAIRING PNEUMATIC TIRES.

No. 852,326.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed December 22, 1906. Serial No. 349,101.

To all whom it may concern:

Be it known that I, FREDERICK L. HARLEY, a citizen of the United States, and a resident of Quakertown, in the county of Bucks and State of Pennsylvania, have invented a certain new and useful Apparatus for Repairing Pneumatic Tires, of which the following is a specification.

The principal object of the present invention is to provide simple, comparatively inexpensive and efficient apparatus for repairing pneumatic tires by vulcanization in a permanent and reliable manner, either on the road or in localities where electric current is obtainable.

To this and other ends hereinafter set forth the invention stated in general terms comprises the improvements to be presently described and finally claimed.

In the drawings I have illustrated apparatus embodying features of the invention, and Figure 1, is an end view partly in section. Fig. 2, is a side view with a part of the device removed. Fig. 3, is a top or plan view with the upper part removed, of an electrical heating unit or device, and Fig. 4, is a transverse sectional view of Fig. 3.

In the drawings 1 and 2, are two members arranged face to face and each having lateral attaching ears 3.

4, is an open ended chamber formed between the members 1 and 2 by longitudinally grooving their abutting faces.

The member 1, is provided with a concaved surface 5, adapted for application to the shoes of tires when the same are in position on the rims of wheels. The member 2, is provided with a flat outer face that is adapted for operation upon inner tubes when the same are flattened.

6, is a receptacle adapted to be placed in the chamber 4 and to be clamped to place therein. Within this receptacle 6, there is arranged a number of heating coils 7, and also a thermostatic cut-out 8.

9, is a socket which may be connected with any suitable source of current. The circuit is by way of the conductor 10, through the coils 11, to a contact 12, carried on the end of an arm 13 made of thermostatic material, such as two strips of different metals properly connected together. The circuit is then by way of the fixed contact 14, when the thermostatic arm is in position for bringing the

two contacts together, which is its normal 55 position. However, when the temperature exceeds that required for proper vulcanization, the thermostatic arm moves into the position shown in Fig. 4 and thus interrupts the circuit. In consequence of this the degree 60 of temperature attainable is automatically limited.

When the device is to be used where there is current the described electrical apparatus is employed. To use the apparatus, a patch 65 is placed upon the part to be repaired and suitable cement, such as can be vulcanized, is employed. The part and the patch are then clamped between the described device and a suitable support and the proper degree 70 of heat continued and applied so as to effect vulcanization. In the case of a flat tube, use may be made of a board 15, provided with clamp screws 16, by means of which the two members of the device are clamped together and the device as a whole is clamped to the tire and patch 17. In patching a shoe the board 15, is applied opposite the face 5, and the tire is clamped between the board and the face 5 and heat is applied to it as 80 above described. When current is not available as for instance on the road, use may be made of a lamp 18, for heating the device. This lamp 18, is provided with a perforated burner 19, into which a wick extends. 85

20, are plates by means of which the lamp may be clamped to the device in position for holding the burner in the chamber 4.

21, is a perforated plate or cap that may be applied to the end of the device opposite 90 the burner and which operates as a damper.

What I claim is,

1. Apparatus for repairing pneumatic tires which comprises two similar separable members arranged face to face and each having lateral attaching ears and a longitudinal groove on the abutting faces and whereof one is flat and the other convex on its outer face and the grooves of said members constituting a chamber, a heating unit or device detachably applied to the chamber and adapted to impart heat to said members, and clamping means for said ears, substantially as described. 95 100

2. Apparatus for repairing pneumatic 105 tires which comprises a housing having a concaved and flat surface, an open ended chamber and a heating unit or device attached to

the chamber and provided with electrical heating apparatus which includes a thermostatic cut-out, substantially as described.

3. Apparatus for repairing pneumatic tires which comprises a housing having a concave and a flat face and provided with laterally extending perforated lugs or ears and with electrical connections, clamping means engaging said ears or lugs, and electrical

heating provisions arranged in the housing and including a thermostatic cut-out for limiting the heat, substantially as described.

In testimony whereof I have hereunto signed my name.

FREDERICK L. HARLEY.

Witnesses:

A. B. STOUGHTON,
FRANK E. FRENCH.

W. S. ANDREWS.

AUTOMATIC CUT-OUT FOR ELECTRIC HEATERS.

APPLICATION FILED JAN. 18, 1910.

1,025,852.

Patented May 7, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

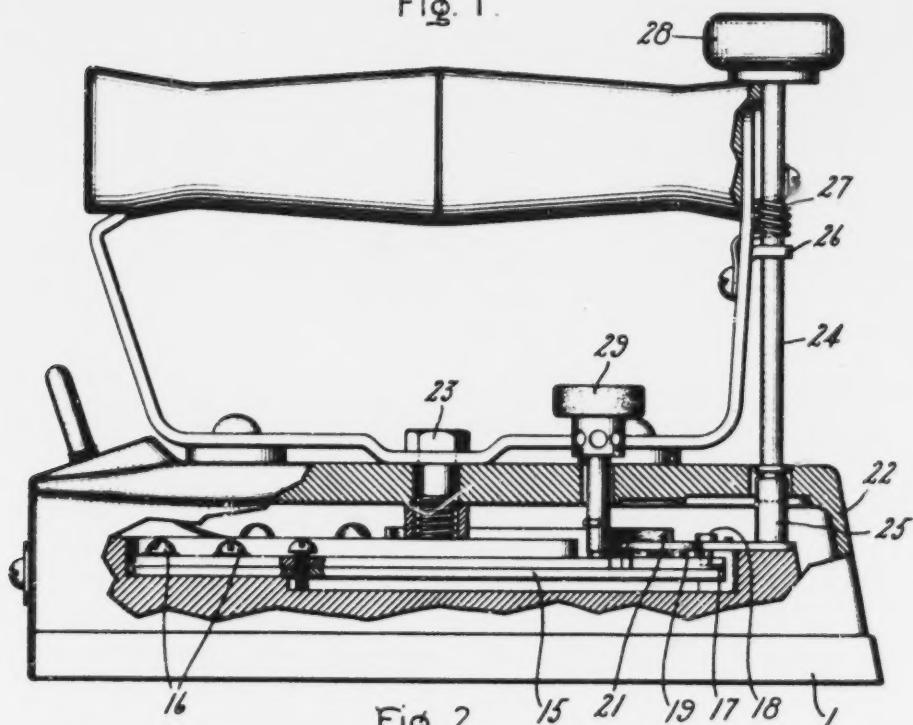
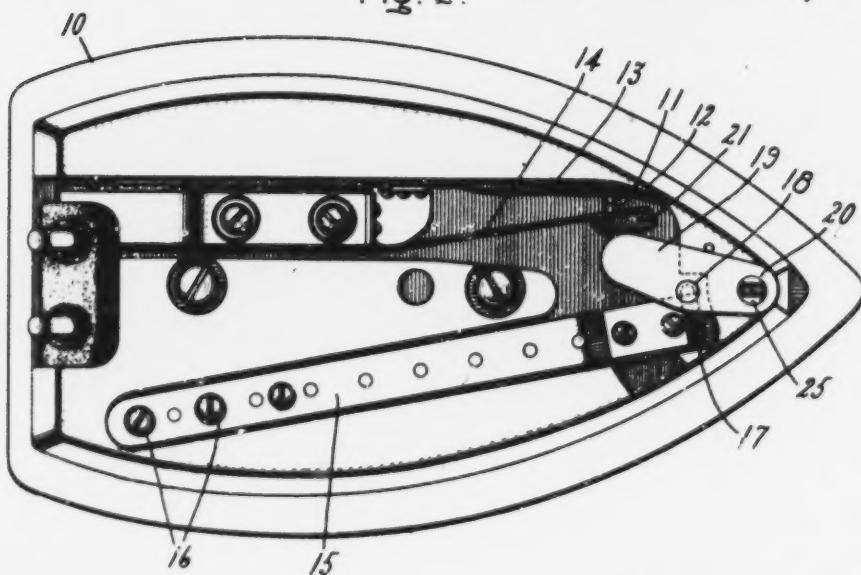


Fig. 2.



Witnesses:

George W. Tidmarsh
J. Ellis Elen

Inventor:

William S. Andrews,

by *Alfred G. Davis*
His Attorney.

359

W. S. ANDREWS.

AUTOMATIC CUT-OUT FOR ELECTRIC HEATERS.

APPLICATION FILED JAN. 18, 1910.

1,025,852.

Patented May 7, 1912.

2 SHEETS-SHEET 2.

Fig. 3.

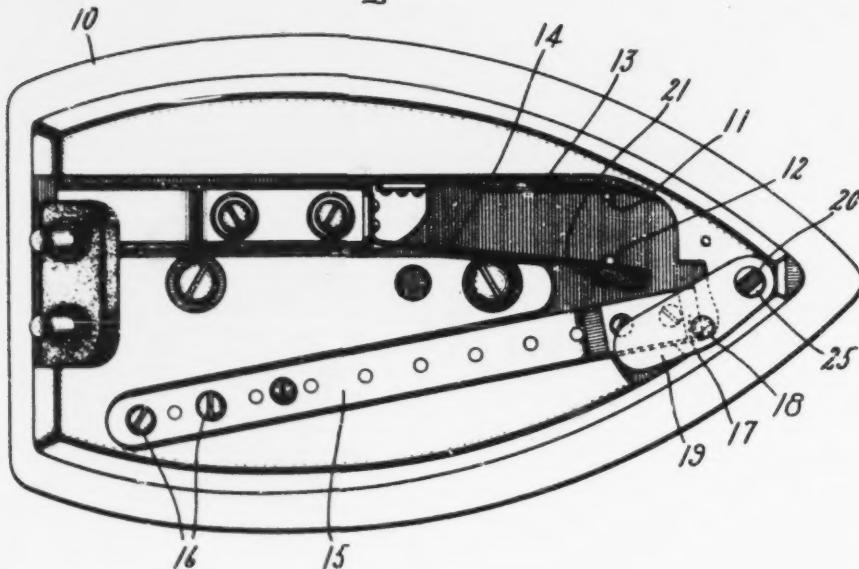
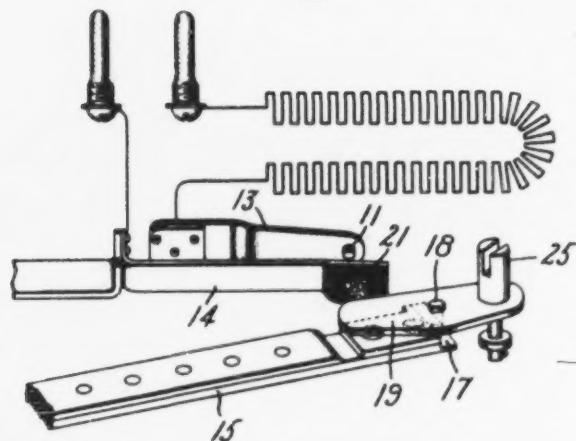


Fig. 4.



Witnesses:

George A. Tilden
J. Ellis Elen.

Inventor:

William S. Andrews,
by *Alfred S. Davis*
His Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM S. ANDREWS, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

AUTOMATIC CUT-OUT FOR ELECTRIC HEATERS.

1,025,852.

Specification of Letters Patent.

Patented May 7, 1912.

Application filed January 18, 1910. Serial No. 538,739.

To all whom it may concern:

Be it known that I, WILLIAM S. ANDREWS, a citizen of the United States, residing at Schenectady, county of Schenectady, State 5 of New York, have invented certain new and useful Improvements in Automatic Cut-Outs for Electric Heaters, of which the following is a specification.

This invention relates to electric heaters 10 and has for its object the provision of means whereby the current will be automatically cut off from the electric heater when the temperature reaches a predetermined point.

My invention relates more specifically to 15 electrically heated flat irons and the like.

In devices of this sort it is often desirable that some means be provided whereby the heat will be cut off from the iron in case the temperature exceeds a predetermined de- 20 gree.

One of the objects of my invention is to provide, in connection with an automatic switch for cutting out the heating unit, means for again closing the switch as well as 25 means whereby the switch may be opened by the operator at any time.

I also provide mechanism for positively latching the switch closed and so arrange the parts that a wide quick break will be 30 given so as to open the circuit effectively and without injury to the switch due to excessive arcing at the contacts.

Other objects of my invention will appear in the course of the following specification 35 in which I have shown my invention embodied in concrete form for purposes of illustration.

In the drawings disclosing one form of my invention, Figure 1 represents a side 40 view of the same, partly broken away to show the operating mechanism; Fig. 2 represents a plan view of the iron with the upper portion removed, the parts of the switch being shown in closed position; Fig. 3 represents a view similar to Fig. 2 with the 45 switch in open position; and Fig. 4 represents a perspective view of the switch and the circuit connections.

Referring to the drawing, 10 represents 50 the body of the iron, which may be of any desired material, such, for instance, as cast iron. The particular shape and construction of this iron, as far as the heating arrangement is concerned, forms no part of

my invention. The heating element may 55 be of any well-known type.

Mounted upon the body of the iron is a switch comprising two contacts 11 and 12 which may be of platinum and when in contact with each other complete the circuit of 60 the electric heater. The contact 11 is mounted upon the resilient metal bar 13. The contact 12 is likewise mounted upon the resilient bar or strip 14. One end of this strip is securely fastened to the body of the 65 flat iron, whereas the end supporting the contact 12 is free to move toward and from the contact 11. This resilient strip 14 is preferably made of such material that it may be heated to a considerable temperature 70 without destroying the resiliency. Normally the contacts 11 and 12 are separated from each other, as shown in Fig. 3.

Mounted longitudinally of the flat iron is a thermostatic element 15. This element 75 may be constructed in any desired manner. I have shown the well-known compound bar type of thermostat which, when heated, will bend due to the difference in the coefficient of expansion of the metals composing it. 80 One end of the thermostatic element is fixed to the body of the heater by screws 16, and the opposite end is free to move with changes of temperature. The free end of this member is adapted to act as a latch for 85 locking switch contacts 11 and 12 in closed position. The latching mechanism comprises a beveled portion 17 on the end of the bar which is adapted to be engaged by a similarly beveled locking bar or bolt 18, 90 preferably of hardened tool steel. This bolt 18 is fixedly mounted in a member 19 pivoted to the body of the iron at 20. The bolt is mounted about midway of the member 19 and the free end of the member is adapted 95 to engage a block of insulating material 21 on the end of the strip 14 adjacent contact 12. The arrangement is such that when the member 19 is turned on its axis, the insulating block 21 is engaged by the end of the 100 member and the contacts 11 and 12 forced into engagement. At the same time the bolt 18 rides along the beveled portion 17 of the thermostatic element and forces the end of the latter downward. By the time the contacts 11 and 12 are in good conducting relation the bolt 18 passes off of the beveled portion 17 and the thermostatic element re-

turns and acts as a barrier for the member 19 so that the switch will be locked in the closed position. A cover 22 is placed over the switch mechanism and the thermostatic element 15 and is held in position by the bolt 23.

In order to operate the member 19 to close the switch, I have provided a rod 24 which enters the slot in the pivot pin 25. This rod 24 projects upward in front of the handle of the iron and is held in place by a guide 26. A spring 27, one end of which is secured to the rod, while the other end is secured to the fixed part of the handle, gives the rod a tendency to turn in a direction to open the switch, or in a counterclockwise direction. On the upper end of the rod 24 is a handle 28 for turning the rod to close the switch.

In order to manually open the switch at any time, I have provided a push button 29 the shank of which projects through the cover of the iron so that the end engages the thermostatic element 15. This push button 29 is arranged conveniently near the handle 28 of the flat iron so that the operator may, by simply pressing a button, force the thermostatic element down and trip the latch, thereby opening the circuit of contacts 11 and 12. A set screw 30 is arranged to adjust the thermostat for various temperatures if desired.

The operation of my device will be very easily understood from the foregoing description. If the temperature exceeds a predetermined degree, the thermostatic element will bend and trip the latch, the spring 27 operating to quickly turn member 19 away from the block 21 to open the switch contacts. In order to again close the switch, the handle 28 is turned. Of course the switch cannot be latched closed until the iron is cooled off sufficiently to permit the thermostatic element to get back to its normal condition. If at any time it is desired to open the circuit without waiting for the iron to reach a predetermined degree of heat, the push button is operated. The circuit will, of course, again be closed by turning the handle 28.

It will be seen that I have provided a very simple arrangement whereby the current may be cut off either automatically or manually and may be again turned on by the operator in a simple manner. The construction is such as to cause a wide quick break to prevent injurious arcing at the contacts.

I have shown my invention embodied in concrete mechanism for purposes of illustration, in accordance with the patent statutes, but it should be understood that I do not limit my invention to the particular construction or arrangement of parts herein described, except in so far as they are limited by the scope of the annexed claims,

since various modifications of my invention will suggest themselves to those skilled in the art without departing from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. The combination with an electric heater, of a normally open switch in the circuit thereof, a thermostatic element for latching said switch closed and releasing the same at a predetermined temperature, and means controlled by the operator for releasing the latch.

2. The combination with an electric heater, of a normally open switch in the circuit thereof, a thermostatic element for latching said switch closed and releasing the same at a predetermined temperature, and means controlled by the operator for actuating the thermostatic element to release the latch.

3. The combination with an electric heater, of a normally open switch in the circuit thereof, a thermostatic element for latching said switch closed, manually operated means for moving the switch to latching position and independent manually operated means for releasing the latch.

4. The combination with an electric heater, of a switch in the circuit thereof biased to open position, a resilient thermostatic element, and means for latching said switch in closed position comprising a beveled member on the thermostatic element and a similarly beveled member associated with the switch.

5. The combination with an electric heater, of a switch in the circuit thereof biased to open position, a thermostatic element, and beveled latching mechanism between the thermostatic member and the switch.

6. The combination with an electric flat iron, of a switch in the circuit thereof biased to open position, a thermostatic element, latching mechanism between the thermostatic member and the switch, manually operated mechanism for moving the parts to latching position, and manually operated mechanism for moving the thermostatic member to release the latch.

7. The combination with an electric flat iron, of a normally open switch in the circuit thereof, a thermostatic element, latching mechanism between the switch and said element, a rotary member for moving the switch to latching position, and a button adjacent the handle for tripping the latch.

8. The combination with an electric flat iron, of a normally open switch in the circuit thereof, a thermostatic element, beveled latching mechanism between the switch and said element, a manually operated member for moving the switch to latching position, and a push button for operating the thermostatic member to trip the latch.

9. The combination with an electric flat-

iron, of a normally open switch in the circuit thereof, means for latching the switch in closed position, an operating member for said latching means, and a releasing member located adjacent the handle of the flatiron and arranged to be operated independently of the operating member.

10. The combination with an electric flatiron, of a normally open switch in the circuit thereof, a latching device for holding the switch in closed position, a member ad-

jacent the handle of the flatiron for latching the switch closed, and independent means located so as to be operated from the top of the flatiron for releasing the latch.

In witness whereof, I have hereunto set my hand this 17th day of January, 1910.

WILLIAM S. ANDREWS.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.

H. W. DENHARD.
ELECTRIC HEATER.
APPLICATION FILED AUG. 31, 1910.

1,143,572.

Patented June 15, 1915

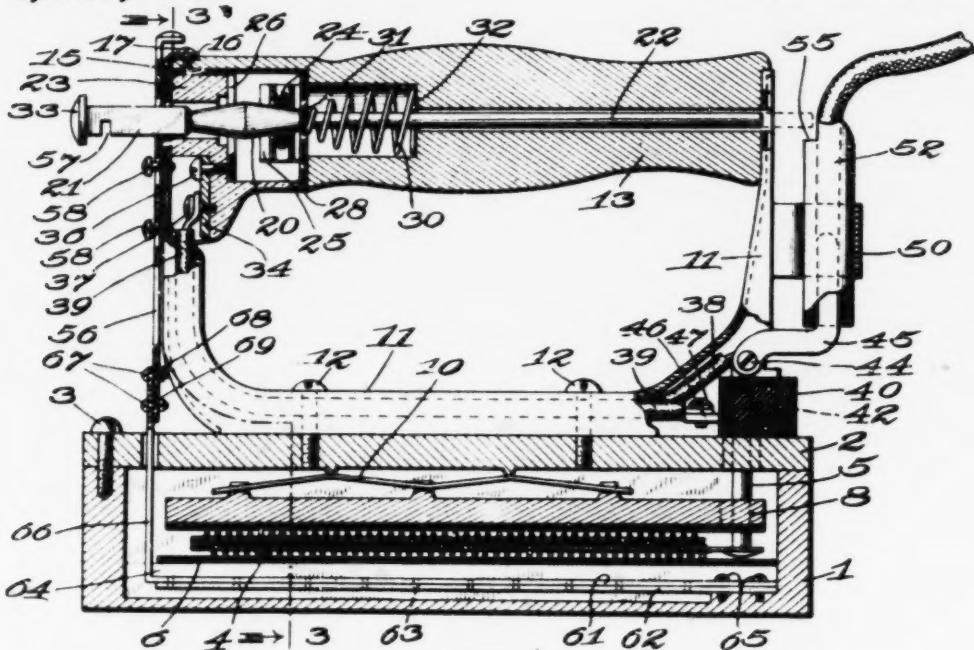
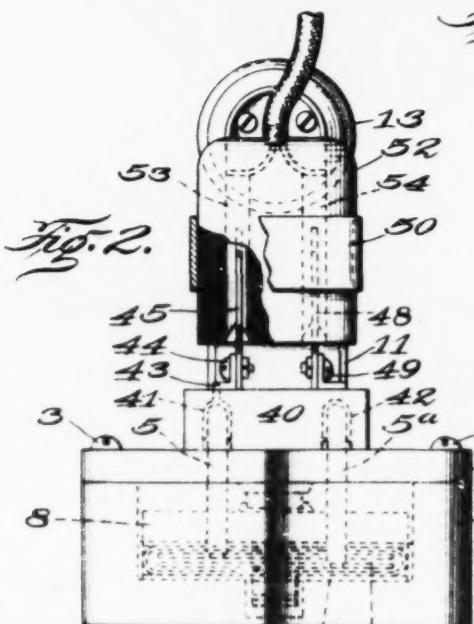
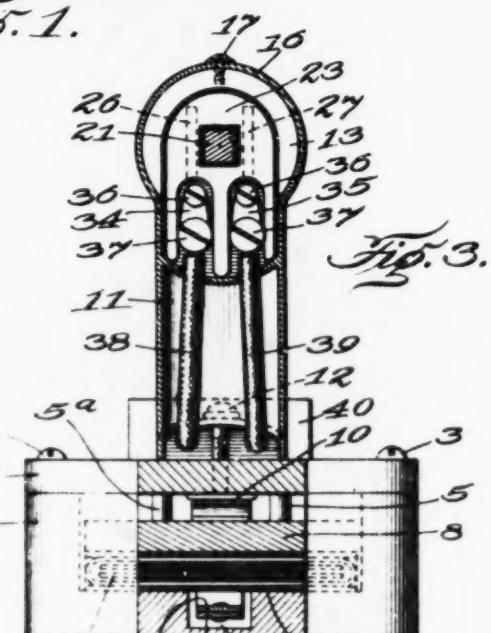


Fig. 1.



Witnesses: 6 4

George Hayes
on & Cetron



4 63 62 64 6 Inventor:

Harry W. Denhard.

By Edwin Post Tower, Jr.
his atty.

UNITED STATES PATENT OFFICE.

HARRY W. DENHARD, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE CUTLER-HAMMER MFG. CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

ELECTRIC HEATER.

1,143,572.

Specification of Letters Patent. Patented June 15, 1915.

Application filed August 31, 1910. Serial No. 579,845.

To all whom it may concern:

Be it known that I, HARRY W. DENHARD, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Electric Heaters, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in electrically heated devices and more particularly to circuit controlling means therefor.

16 One object of my invention is to provide means for automatically disconnecting the device from circuit when the temperature of said device or a part thereof has attained a predetermined maximum.

20 Various other objects and advantages of my invention will be hereinafter clearly and fully set forth.

25 My invention is applicable to various kinds of electrically heated devices and is particularly applicable to electrically heated flat irons.

According to the preferred form of my invention, I provide on the device a circuit controlling switch, as distinguished from 30 the connection plug, for making and breaking the circuit of the device, and provide in conjunction therewith a thermostatic device responsive at a predetermined temperature to cause the control switch to break 35 circuit. Also, I prefer to provide a mechanical interlock between the control switch and the connection plug, necessitating operation of the control switch to disconnect the device from circuit prior to the detachment 40 of the connection plug.

In order to more fully disclose the nature and characteristic features of my invention, I shall describe the device illustrated in the accompanying drawing, a flat iron being 45 chosen for the purpose of illustration. It should be understood, however, that my invention is not limited to the particular structure illustrated, but is susceptible of various modifications and applicable to various 50 other kinds of devices.

In the accompanying drawings, Figure 1 is a longitudinal sectional view through the iron. Fig. 2 is a rear elevation of Fig. 1, certain parts being shown in section, and 55 Fig. 3 is a front section on line 3—3 Fig. 1.

Briefly described the general structure of the iron is as follows: The body portion is formed in two sections, 1 and 2. The section 1 is hollow and forms the bottom and sides, while the section 2 forms the top. The sections are illustrated as being secured together by screws 3. Within the body portion is arranged a resistance unit 4 having terminal lugs 5 and 5^a projecting upwardly through the section 2. The resistance unit is arranged to rest upon one or more layers of insulating material 6, preferably comprising sheets of mica, which insulate the same from the bottom of section 1. Upon the resistance unit is placed a weighted metallic plate 8, one or more layers of insulating material being interposed between said plate and said unit. The resistance unit 4 and the plate 8 are pressed toward the bottom of the iron by a resilient strip 10 bent in a zigzag manner and interposed between said plate 8 and the top section 2 of the iron.

The parts above mentioned have only been briefly described herein, inasmuch as the specific structure thereof is not essential to my present invention and because they have been fully and clearly described in previously issued United States Letters Patent, granted me.

The handle and handle frame may be of any preferred construction. As illustrated, the handle frame 11 is formed of sheet metal and secured to the body portion by screws 12. The handle frame 11 is preferably curved in cross section for strengthening purposes and also for concealing certain electrical conductors, as will be hereinafter described. The handle 13 is supported by the extremities of the frame 11. As will be hereinafter seen, the forward end of the handle contains a switch mechanism, which renders it unpractical to secure the supporting frame to the end face thereof. Accordingly, I prefer to provide the forward end of the supporting frame 11 with an enlarged portion 15, substantially covering the forward end face of the handle, and to provide the portion 15 with a flange or lug 16 adapted to be secured to the handle by screws 17. It should be understood, however, that the handle may be secured to a supporting frame in any preferred manner.

The control switch which I have provided

is mounted directly in the handle 13 and is operable from the forward end thereof. In practice, the control switch might assume various different forms. As illustrated, this switch comprises a double inclined operative member 20 preferably circular in cross section throughout its entire length and having extensions 21 and 22 for slidably supporting the same. The extension 22 is arranged to work in a longitudinally extending opening in the handle 13 and for a purpose herein-after described, the extension 22 is preferably of such length as to protrude from the end of the handle when the member 20 is operated. The extension 21 is arranged to slide longitudinally in a bearing block 23 of insulating material, said block being secured in place in any preferred manner. Surrounding the member 20 and arranged to move longitudinally thereof, is a circular expandible member 24 preferably formed of a helical spring having its ends secured together. The spring 24 is arranged within a suitable contact member 25 also adapted to move longitudinally of the member 20. The contact 25 co-operates with stationary contacts 26 and 27 which may conveniently be attached to the portion 23. At the rear of the contact 24 is provided a stop plate 28. Briefly described the operation of the switch is as follows: When the member 20 is pressed to the right the spring 24 is expanded until the crest of the operating member is forced through the same, whereupon the spring will rapidly move down the oppositely inclined surface of the member 20 and thereby move the contact 25 into engagement with the contacts 26 and 27 to electrically connect the same. Upon the movement of the member 20 in the opposite direction, the contact 25 will be held in engagement with the contacts 26 and 27 until the crest of the member 20 again passes through the spring 24, whereby the spring will have been expanded. Then the spring will contract and quickly move down the oppositely inclined portion of the member 20, thereby quickly moving the contact 25 out of engagement with contacts 26 and 27. For a purpose hereinafter set forth, I prefer to bias the member 20 in a direction to move the contact 25 out of engagement with contacts 26 and 27. A convenient means for accomplishing this, comprises a spiral spring 30 surrounding the extension 22 and interposed between a flange 31 on the member 20 and a shoulder 32 provided within the handle 13. For facilitating the operation of the switch, I have provided a suitable push button 33 on the end of the extension 21 of the member 20. Set in suitable recesses provided in the insulating block 23 are terminal plates 34 and 35 electrically connected to contacts 26 and 27 respectively by screws 36. Each of these terminal plates is pro-

vided with a binding screw 37. To the binding screw of terminal plate 34 is connected a conductor 38 and to the binding screw of the plate 35 is connected a conductor 39. The conductors 38 and 39 extend from the terminal plates to the rear end of the body portion of the iron, said conductors being inclosed within the sheet metal support 11 for the handle 13. The extremities of the conductors 38 and 39 are adapted to be connected to parts of the connection plug, which I shall now describe.

The terminal lugs of the resistance element of the iron project into an insulating block 40, which may be secured to the plate 2 of the iron in a suitable manner. Within the insulating block 40, (as best illustrated in Fig. 2) are conducting sleeves 41 and 42 arranged to surround and make electrical contact with the terminal lugs 5 and 5^a respectively of the resistance element. The sleeve 41 is provided with an extension 43 projecting through the top of the insulating block 40 and having secured thereto as by means of a screw 44 a lug 45. The sleeve 42 has an extension 46, best illustrated in Fig. 1, which projects through the front of the block 40 and carries a binding post 47. Suitably secured to the top of the block 40 and arranged parallel to the lug 45 is another lug 48 having a binding screw 49. It will thus be seen that the lug 45 is electrically connected to the terminal lug 5 of the resistance unit and thus in effect forms an extension thereof, while the lug 48 is electrically independent of the terminal lug 5^a of the resistance unit. The conductor 39, however, is electrically connected by binding screw 47 to the extension of sleeve 42, contacting with terminal lug 5^a of the resistance unit, while conductor 38 is connected by binding screw 49 to the lug 48. Hence, when the control switch is operated to electrically connect contacts 26 and 27, the lug 48 will be electrically connected to the terminal lug 5^a of the resistance unit. On the other hand, when the control switch is opened the circuit will be broken between the lug 48 and the terminal lug 5^a. The lugs 45 and 48 are substantially L-shaped, the perpendicular portions thereof projecting into a suitable casing 50 secured to the rear end of the handle frame 11 in any suitable manner. The casing 50 is adapted to receive a suitable plug 52 having therein suitable contact clips 53 and 54 arranged to engage and make electrical contact with the lugs 45 and 48 respectively. The contact clips 53 and 54 of the plug 52 are electrically connected to the supply wires. Accordingly, when the plug 52 is inserted in place and the control switch closed, current will flow from one of the supply wires to the contact clip 54, lug 48, conductor 38, through the control switch by conductor 39 130

to terminal 5^a of the resistance unit, thence through said unit to terminal lugs 5 thereof, thence to lug 45 and contact clip 53 of the plug 52 to the other supply wire. Circuit 5 through the resistance unit may thus be controlled at will by operation of the control switch located in the handle of the iron.

It is well recognized that a quick make and break of an electrical circuit is always preferable. The control switch, which I have provided, insures such a make and break of the circuit, while a very slow make and break would result upon the insertion and withdraw of the connection plug 52. I, therefore, desire to provide an interlock between the connection plug 52 and the control switch, which will prevent insertion or withdrawal of the connection plug, except when the control switch is in open position. This will insure the circuit being always made and broken by the control switch. Various means might be provided for accomplishing this result. The means which I have illustrated comprises the extension 22 on the operating member of the control switch. As previously set forth when the operating member is moved to close the control switch, the extension 22 is caused to project from the rear end of the handle. I have, therefore, provided on the connection plug 52 a shoulder 55, into the path of which the extension 22 is adapted to project as illustrated in dotted line, Fig. 1, when the control switch is closed. The plug 52 can only be inserted and withdrawn by a vertical movement thereof and hence so long as the extension 22 remains in the dotted line position, it prevents withdrawal of the plug 52. Likewise, it prevents insertion of the plug 52, if an attempt is made to insert the plug while the control switch is closed.

The control switch as previously described is biased to open position. For holding the control switch in closed position, I have provided a sliding plate 56 adapted to enter a notch 57 in the operating member of said switch. This plate may be conveniently attached to the portion 15 of the handle frame 11 by screws 58 passing through slots in said plate, said slots permitting the desired longitudinal movement of said plate. The plate 56 is preferably provided with an extension projecting slightly above the top of the handle 13 to facilitate movement of said plate to release the switch at will. The plate 56 is connected to the thermostatic device which I shall now describe.

While in practice, the thermostatic device may be of any preferred construction, I have illustrated the same as merely comprising two metallic strips 61 and 62 having different expansion characteristics. Of course, various materials may be used in practice. Very satisfactory results can be

obtained by forming one strip of brass and the other of steel. These strips are preferably secured together by rivets 63 at numerous points throughout their length. The inner face of the base of the iron is preferably provided with a longitudinal recess 64 for accommodating the strips 61 and 62 to relieve the same from all pressure of the resistance unit and to permit freedom of movement of the strips under the influence of heat. In practice, I prefer to secure the extremities of the strips to the iron adjacent to its rear end as by screws 65 and to so superimpose one strip upon the other that upon predetermined rise in heat the free ends thereof will be drawn downwardly. One of the strips 61 or 62 is provided with an extension 66 projecting upwardly through the top of the iron and secured as by means of screws or bolts 67 to the end of the plate 56. Thus, when the thermostatic strips are effected by heat, they will move the plate 56. Accordingly, if the strips are so arranged as to buckle downwardly when the heat of the iron rises to a predetermined degree, they will draw the plate 56 downwardly, thereby releasing the control switch which will then move to open the circuit through the iron.

I desire to so design the thermostatic device that under normal temperature conditions, it will exert a sufficient upward pressure on the plate 56 to retain said plate in the notch 57 and thus insure retention of the control switch in closed position. In practice, the thermostatic device may be arranged in different locations. In electric irons, however, I deem it preferable to locate the same as illustrated, inasmuch as it will be subjected directly to the heat of the working face of the iron. In other words, it is the temperature of the working face of the iron that it is desired to regulate and the thermostat will naturally function with the greatest efficiency when located contiguous to the working face as illustrated.

In actual use it may be desired to vary the maximum temperature of the iron and accordingly, I desire to make the thermostatic device adjustable to meet the different requirements. The desired adjustment may be secured in various ways. With the particular thermostatic device illustrated, the desired adjustment can readily be obtained by providing slots 68 and 69 in the extension 66 of the thermostatic device through which the screws or bolts 67 extend. With such an arrangement it will be seen that the plate 56 may be adjusted relatively to the thermostatic device, thereby varying the distance which the plate projects into the notch 57 under normal temperature conditions. Thus the thermostatic device could be made to withdraw the plate 56 from the notch 57 upon different predetermined movements.

thereof. For instance, if it be desired to cause the release of the control switch upon a slight rise in temperature of the iron, then the plate should be adjusted relatively to the thermostatic device so that it will only project a slight distance into the notch 57 under normal temperature conditions. On the other hand, if it be desired to allow the temperature of the iron to rise to a higher degree, the plate 56 should be adjusted to project farther into the notch 57 under normal temperature conditions.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with an electrically heated device having a handle, of a control switch for said device biased in a direction to disconnect the same from circuit, said switch having means for retaining the same in circuit-closing position and having an operating member and a tripping member adjacent to said handle.

2. In combination, an electric iron, a quick acting control switch arranged within the handle thereof and operable at will and thermostatic means having its temperature responsive portion in proximity to the working face of the iron for controlling said switch.

3. In combination, an electrically heated iron provided with connection terminals, a quick acting control switch therefor mechanically independent of said connection terminals and a thermostatic device arranged within said iron and responsive to the thermic conditions of the working face thereof, said thermostatic device controlling said switch to automatically disconnect said iron from circuit under predetermined thermic conditions.

4. In combination, an electric iron, a thermostatic device arranged within said iron in close proximity to the working face thereof, and an inherently quick make and break switch controlled by said thermostatic device to disconnect the iron from circuit under predetermined thermic conditions, said thermostatic device comprising an elongated member formed of strips of different materials secured together at a plurality of points, said member extending substantially the entire length of the working face of the iron.

5. In combination, an electrically heated iron, a detachable connection plug carried thereby, a quick acting control switch operable at will to make and break the circuit of said iron, and means necessitating operation of said switch to disconnect said iron from circuit prior to the removal of said connection plug.

6. In combination, an electrically heated iron, a detachable connection plug carried thereby, a switch carried by said iron for controlling the circuit therethrough, and a mechanical interlock between said switch and said connection plug for preventing detachment of the latter until said switch has been operated to open the circuit of said iron.

7. In combination, an electrically heated iron, a detachable connection plug carried thereby, a switch carried by the handle of said iron for controlling the circuit thereof, and a mechanical interlock between said switch and said connection plug for preventing detachment of the latter until said switch has been operated to disconnect the iron from circuit.

8. An electrical heating device having a handle, a switch in said handle for controlling the circuit of said device and temperature responsive means for controlling the operation of the switch.

9. An electric heating device having a handle, a switch in said handle normally biased in one direction, temperature responsive means normally adapted to restrain said switch against the biasing means and operable to release said switch under predetermined temperature conditions.

10. An electric heating device having a switch normally biased to open position, means for holding said switch in closed position, a thermostatic device for controlling said means to release said switch, a connector plug and means whereby the plug can be removed only when the switch is open.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

HARRY W. DENHARD.

Witnesses:

FRANK H. HUBBARD,
GEORGE HAYNES.

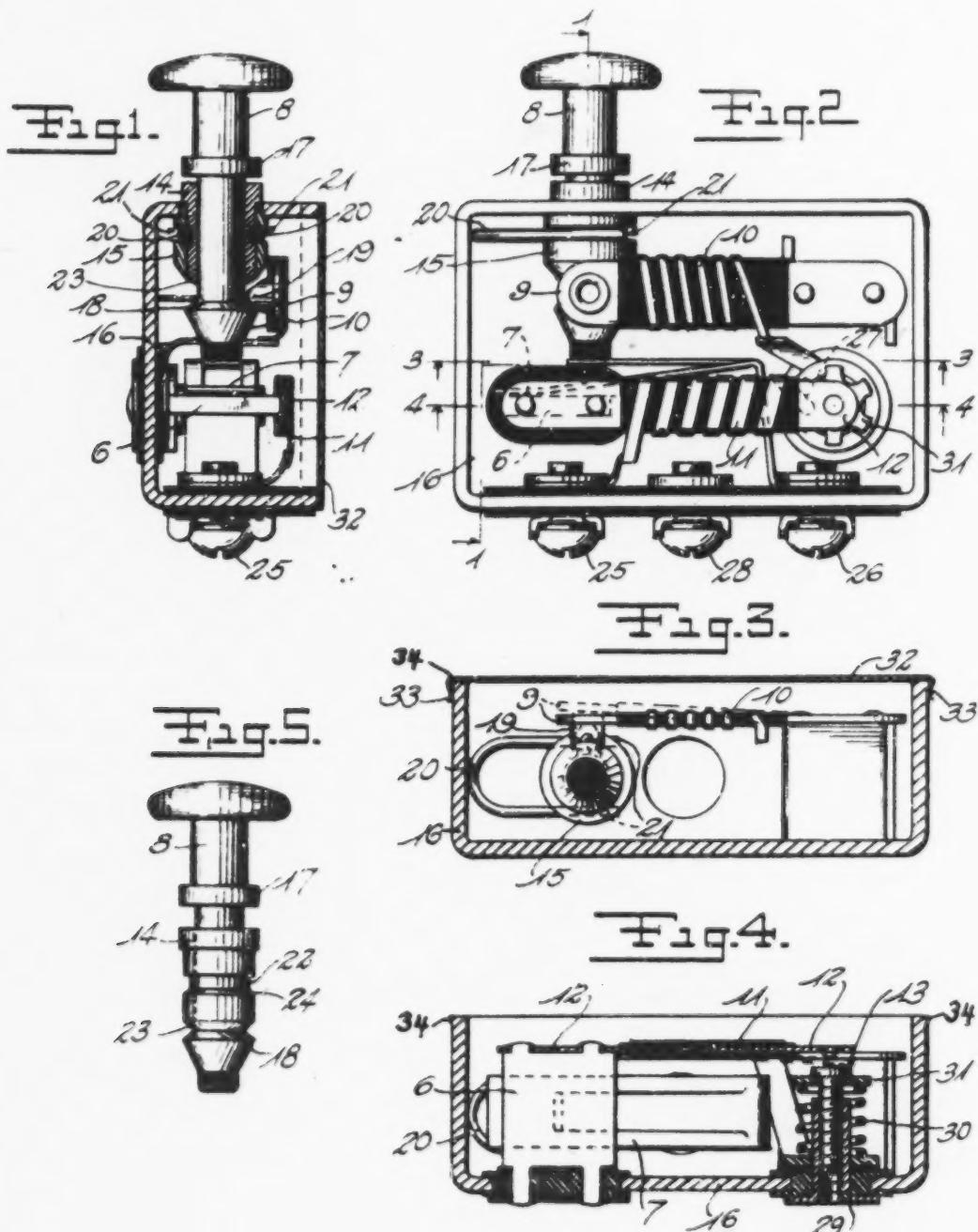
J. F. CAVANAGH,

LOCK SWITCH.

APPLICATION FILED NOV. 14, 1918.

1,294,045.

Patented Feb. 11, 1919.



INVENTOR

INVENTOR
John F Cavanagh
BY
Mitchell & all

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN F. CAVANAGH, OF MERIDEN, CONNECTICUT, ASSIGNOR TO CONNECTICUT TELEPHONE & ELECTRIC COMPANY, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

LOCK-SWITCH.

1,234,045.

Specification of Letters Patent

Patented Feb. 11, 1919.

Application filed March 14, 1918. Serial No. 222,312.

To all whom it may concern:

Be it known that I, JOHN F. CAVANAGH, a citizen of the United States of America, residing at Meriden, Conn., have invented a new and useful Lock-Switch, of which the following is a specification.

My present invention relates to what are generally known as "lock switches", particularly for use on motor vehicles, which are designed to be "locked" or rendered inoperative when the machine is left unattended.

The objects of the invention generally are to provide a switch of this character of simple, inexpensive and entirely practical construction.

Another object is to combine the locking and controlling functions all in a single member so that by means of a single "controller" the switch may be operated to open or close the circuit or may be locked or rendered entirely inoperative.

Briefly stated, the invention resides in the combination with a suitable supporting base and circuit contacts mounted thereon, of a plunger or operating member having a certain limited movement on the base for controlling the circuit contacts and adapted to be entirely removed and separated from the base for the purpose of rendering the switch inoperative. In connection with said plunger there may be provided a thermostatically controlled latch for holding the plunger in a predetermined position and the invention embodies various other features and details of construction all as will later appear.

In the accompanying drawing I have illustrated the invention embodied in a practical commercial form but would have it understood that changes and modifications may be indulged in without departure from the true spirit and scope of the invention.

In said drawing:-

Figure 1, is a vertical sectional view of a switch constructed in accordance with and embodying the invention, said view being taken substantially on the plane of the line 1-1 of Fig. 2.

Fig. 2, is a view of the switch mechanism with the side wall of the switch casing removed.

Figs. 3 and 4 are sectional views taken

substantially on the planes of the lines 3-3 and 4-4 respectively of Fig. 2.

Fig. 5, is a detail view of the detachable operating key or plunger.

The switch illustrated is a so-called automatic ignition switch of the character disclosed in my Patent #1,232,458 consisting generally of a relatively stationary contact 6 and a spring contact 7, the latter being forced into engagement with the former by means of an operating key or plunger 8 which plunger is normally retained in the circuit-closed position by means of a thermostatic bar 9 which, when the circuit is left in closed condition, is warped through the action of a heating coil 10 engaged therewith to release the plunger and thus permit the spring contact to separate from the stationary contact. This heating coil may be cut into circuit automatically by means of a primary heating coil 11 connected in the ignition circuit and coiled about the thermostatic bar 12 which, as it becomes heated due to the continued closed condition of the ignition circuit, makes engagement with a contact 13 forming a terminal for the heating coil 10.

The combined lock or key and switch operating plunger has a limited movement for the purpose of controlling the switch contacts and is removably supported so that it may be entirely disconnected and detached from the switch structure. In the present disclosure this is accomplished by slidably supporting the plunger within a bushing 14 and by detachably securing this bushing within a socket or tubular guide 15, the latter forming a part of, or being secured to the casing 16, which in this instance forms a base for the switch parts. The limited circuit-controlling movements of the plunger are provided for by the shoulders 17 and 18 on the plunger which limit the movements of said plunger within the tubular bushing 14. The lower shoulder 18 in the present disclosure is beveled to cooperate with a beveled lug 19 on the end of the thermostatic bar 9. The double bevel or inclination of this shoulder 18, as illustrated, enables the plunger being shifted either inward or outward against the tension of the thermostatic latching bar 9 and at the same time enables said

latching bar to yieldingly hold the plunger in either of the positions to which it may be shifted.

The supporting bushing 14 is removably secured in place in the present disclosure by a hairpin spring 20 engaged about the tubular guide 15 and with the spring arms thereof extending in through slots 21 in the sides of said tubular guide into position to engage in an annular locking groove 22 formed in the supporting bushing. The lower end of the supporting bushing is preferably beveled as indicated at 23 to spread the spring arms apart as the key is being inserted in the switch and the lower shoulder or edge of the groove 22 in the bushing may be beveled somewhat as indicated at 24 to facilitate the removal of the plunger.

When the plunger is engaged in its seat in the switch as in Fig. 1, it may be shifted either out or in to open or close the circuit at will. If left in the circuit-closed position and the circuit is closed at other points, the latching thermostat will operate to automatically release the plunger and thus permit separation of the circuit contacts. If it is desired to lock the switch inoperative, it is merely necessary to pull the switch plunger and its supporting bushing out of its socket, leaving the switch contacts separated, with no means for bringing them into closed relation. The key plunger, with its associated bushing, is relatively light and small and so can easily be carried about. When it is desired to close the circuit again, the plunger is simply forced to its seat in the socket provided therefor and when thus engaged in its socket may be shifted to either the open or the closed circuit position. In inserting the plunger the upper shoulder 17 on said plunger acts as an abutment for forcing the bushing down into the tubular guide or socket, and in removing the plunger the lower shoulder 18, serves as an abutment engaging the lower end of the bushing to carry the bushing along with the plunger.

The various parts of the switch may be suitably mounted within the supporting base 16 and the necessary circuit terminals will be provided therefor. In the illustration there is provided one terminal 25 for the primary heating coil 11, and another terminal 26 for the spring contact 7, one end of the primary heating coil is connected with the thermostatic bar 12 on which it is mounted, as indicated at 27, and said bar is directly connected with the stationary contact 6, as shown in Fig. 4 so that under normal working conditions the ignition circuit will be completed by way of terminal 25, primary heating coil 11, thermostatic bar 12, stationary contact 6, spring contact 7 and terminal 26. If the circuit remains closed for a dangerous length of time, as

predetermined upon, coil 11 heats the bar 12 sufficiently to cause it to make contact with the terminal 13 for the secondary heating coil 10, which latter then quickly heats up the thermostatic bar 9 to such an extent 70 as to cause said bar to release the plunger and allow the spring contact to separate from the stationary contact and thus break the ignition circuit. The circuit for the secondary heating coil 10 may be completed 75 through the switch base 16, which is usually in the form of a metallic box, by fastening the thermostatic bar 9 directly to the box, by connecting one end of the heating coil 10 with the bar and by providing an external terminal 28 in electrical connection with the box.

The terminal 13 for the heating coil 11 is of novel construction, comprising as it does, a screw stud engaged within a tubular bushing 29 set in the rear wall of the box or casing 16, there being a spring 30 coiled about said bushing and engaged between the inner wall of the box and an abutment washer 31 at the contact end of said 90 contact screw 13. This spring, acting as it does against the inner wall of the box, serves to retain the bushing in place, which is entered from the outside of the box and at the same time acts frictionally to hold the 95 contact screw in its adjusted position. The outward end of the contact screw may be slotted, as indicated, or otherwise constructed for engagement by an adjusting tool such as a screwdriver, so that the point at which 100 the main thermostatic bar 12 will close circuit through the unlatching heating coil may be readily determined.

The invention will from the foregoing be seen to possess many advantages, particularly in the ease with which the switch may be locked or rendered inoperative and again be made operative and controlled as desired.

The open side of the switch casing may be closed by a suitable cover such as that indicated at 32, having flanges 33 engaged over ribs or flanges 34 at the edge of the casing.

I claim:

1. In a switch of the character described, a supporting base, circuit controlling contacts on said base, a removable operating member for said contacts, a support for said operating member readily removable from the supporting base and arranged when engaged on the supporting base to permit movement of the operating member for the opening and closing of the circuit through the switch contacts and means for detachably securing said support for the operating member on the supporting base, whereby 115 said support and the operating member carried thereby may be entirely detached from the supporting base, and whereby when said support is engaged with the supporting base 120 the operating member may be actuated to 125

operate the switch contacts for opening or closing the circuit, and means whereby the operating member may be left in position with the contacts in open or closed circuit position.

2. In combination, switch contacts, a supporting bushing, a plunger for controlling the switch contacts slidably engaged in the bushing, a socket for the bushing and means for yieldingly securing said bushing in the socket.

3. In combination, switch contacts, a supporting bushing having a locking shoulder on the side thereof, a contact controlling plunger slidably mounted in the bushing and having shoulders for engagement with the opposite ends of the bushing, a socket for supporting the bushing with the plunger carried thereby in operative relation to the switch contacts, and securing means engaged with the shoulder on the bushing.

4. In combination, switch contacts, a plunger for controlling said contacts, a removable bushing for supporting the plunger in operative relation to the contacts, and spring means for yieldingly and removably securing said bushing in such position.

5. In combination, a switch base provided with a socket, contacts mounted on said base, a bushing removably engageable in said socket, spring means engaging said bushing to yieldingly retain the same in the socket, a plunger slidably engaged in the bushing for controlling the switch contacts, and shoulders on the plunger for engagement with opposite ends of the bushing to limit the switch operating movements of the plunger, and arranged to form abutments for the bushing when the bushing is inserted in or removed from the socket by means of the plunger.

6. In combination, switch contacts, a tubular guide, a hairpin spring embracing said tubular guide and having one arm thereof projecting within the guide, a bushing engageable within the tubular guide and

provided with an annular groove to receive the inwardly projecting spring arm aforesaid, and a contact controlling plunger having a limited sliding movement within the bushing.

7. As an article of manufacture, a supporting bushing having an annular locking groove therein for engagement by securing means and a switch controlling plunger having a limited sliding movement in said bushing.

8. The combination in a switch, of a casing, an interiorly threaded post passed through said casing from the outside to the inside thereof, a contact screw rotatably engaged in said tubular post at the inside of the casing and provided with means at its outer end for engaging with an operating tool, and a coil spring engaged about the tubular post between the inner wall of the casing and the inner end of the contact screw to frictionally retain said screw in the position to which it is adjusted from the outside of the casing.

9. As an article of manufacture, a pull-out switch operating plunger and a supporting bushing having limited sliding movement thereon and provided with a locking shoulder for engagement with a locking device when said plunger with its bushing is pushed into a seat in a switch.

10. In a switch of the character described, a supporting base having a tubular guide, a bushing removably engaged in said guide, a plunger having a limited sliding movement in the bushing, circuit controlling contacts on the base positioned to be controlled by the plunger in the push-and-pull movements thereof and spring means for yieldingly securing the bushing in the tubular guide therefor and arranged to yield on the application of a pulling force to the plunger to enable the plunger and attached bushing being entirely withdrawn from the base.

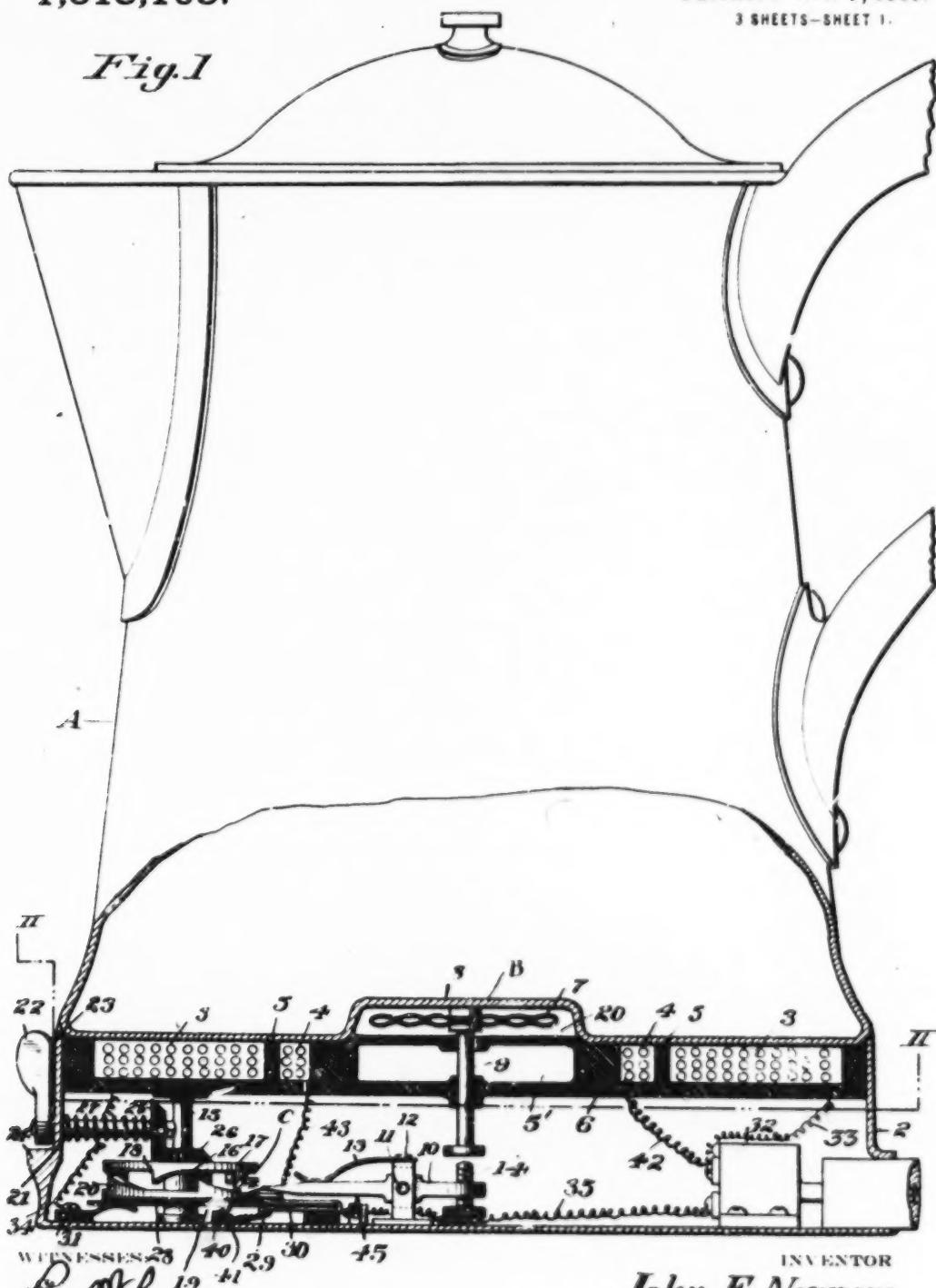
JOHN F. CAVANAGH.

1,318,168.

Patented Oct. 7, 1919.

3 SHEETS-SHEET 1.

Fig. 1



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 B. F. Abbott.*

INVENTOR
*John F. Newsom
 Strong Townsend*

J. F. NEWSOM.

AUTOMATICALLY CONTROLLED ELECTRIC COFFEE COOKER.
APPLICATION FILED MAY 29, 1916

1,318,168.

Patented Oct. 7, 1919.

3 SHEETS - SHEET 2.

Fig. 5.

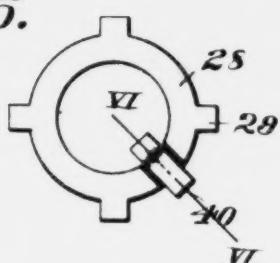


Fig. 2

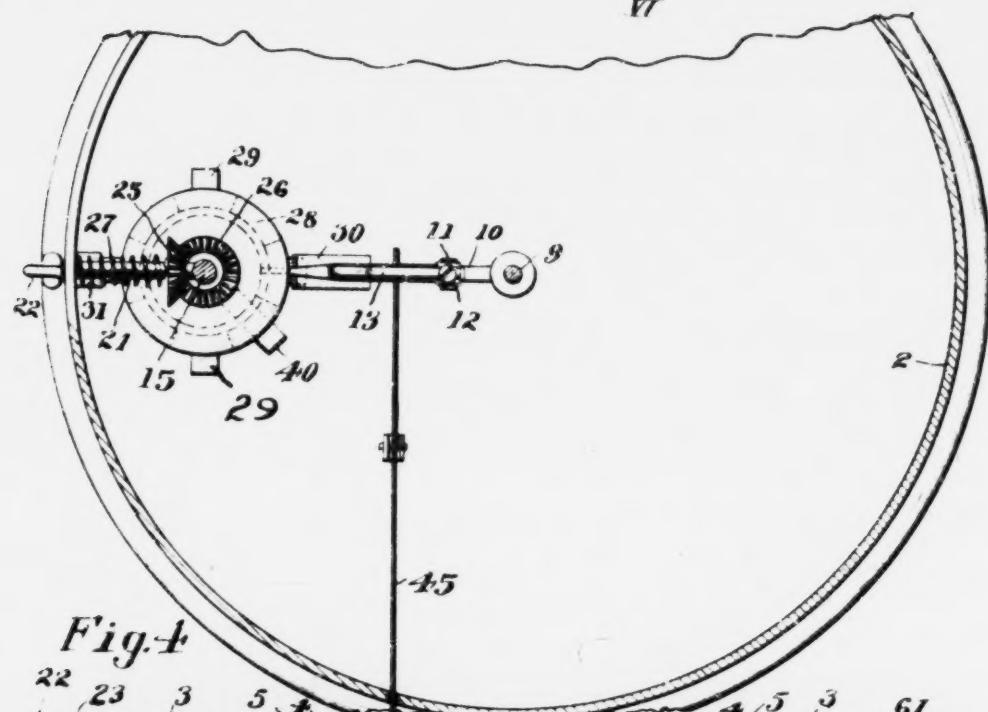
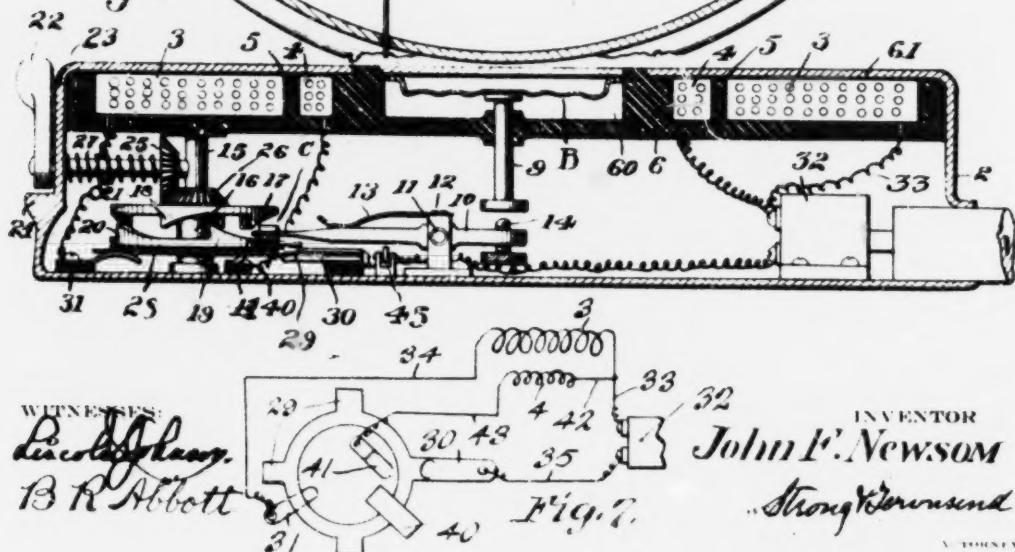


Fig. 4



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INVENTOR

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374

J. F. NEWSOM.

AUTOMATICALLY CONTROLLED ELECTRIC COFFEE COOKER.

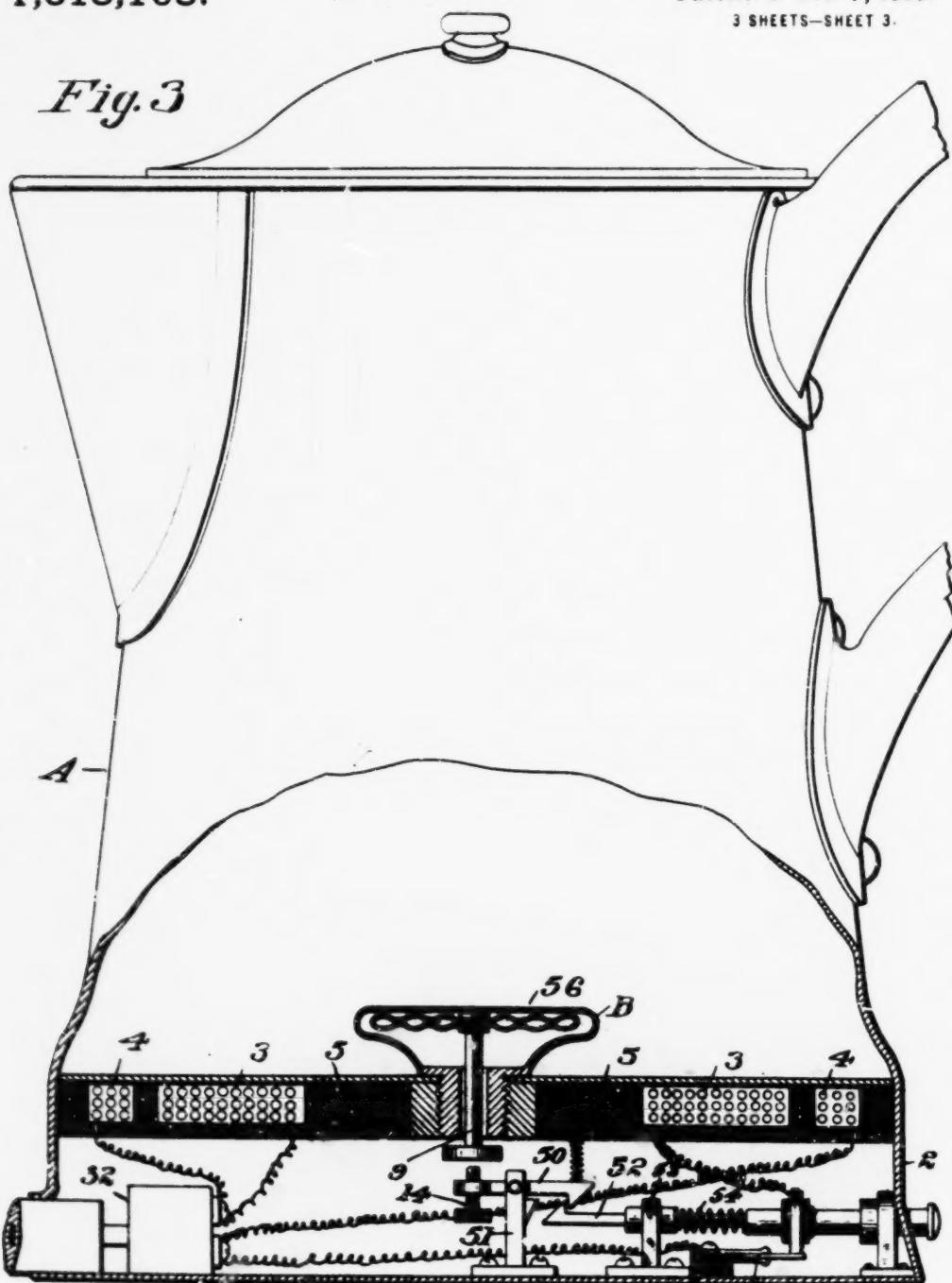
APPLICATION FILED MAY 29, 1916.

1,318,168.

Patented Oct. 7, 1919.

3 SHEETS—SHEET 3.

Fig. 3



WITNESSES:

Lowell Johnson
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C 55 INVENTOR

John F. Newsom

Henry P. Townsend
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JOHN F. NEWSOM, OF PALO ALTO, CALIFORNIA.

AUTOMATICALLY-CONTROLLED ELECTRIC COFFEE-COOKER.

1,318,168.

Specification of Letters Patent.

Patented Oct. 7, 1919.

Application filed May 29, 1916. Serial No. 100,528.

To all whom it may concern:

Be it known that I, JOHN F. NEWSOM, a citizen of the United States, residing at the city of Palo Alto, county of Santa Clara, 5 and State of California, have invented new and useful Improvements in Automatically-Controlled Electric Coffee-Cookers, of which the following is a specification.

This invention relates to an automatically controlled electric coffee cooker, and particularly to improvements on my co-pending application entitled "Electric coffee cooker," filed February 7, 1916, Serial Number 76,586.

15 An object of the present invention is to provide a simple, cheaply manufactured, economic electric cooker provided with means for regulating the time of cooking coffee, or other beverages and foods, and 20 particularly to provide a thermostatic switch control adapted to be actuated by the temperature obtained within the cooking receptacle, or other object heated, to intermittently or permanently break the electric circuit 25 through the heating elements when predetermined temperatures are reached within the cooker. Further objects will hereinafter appear.

The invention consists of the parts and 30 the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a central, vertical section 35 through the cooker.

Fig. 2 is a plan view on line II—II of Fig. 1.

Fig. 3 is a view similar to Fig. 1, showing a modification of the automatic switch.

40 Fig. 4 is another view similar to Fig. 1, showing the cooker removed.

Fig. 5 is a plan view of the switch member 28.

Fig. 6 is a section taken on the line VI— 45 VI of Fig. 5.

Fig. 7 is a diagrammatic view, showing the wiring diagram employed.

Referring to the drawings in detail, A indicates the coffee pot proper and 2 the 50 base upon which it is mounted. Any suitable shape may be given to the pot, which will hereinafter be termed a "receptacle," but the preferable shape is here shown. The receptacle is heated by a main heating element 3 and an auxiliary element 4. These 55 elements are mounted in the upper portion

of the base and are suitably insulated from each other and the base by means of a heat-insulating material 5. The main novelty in the present invention resides in the provision of the thermostat, generally indicated at B, and the automatic switch, generally indicated at C; the thermostat, together with the switch mechanism shown, being provided for the purpose of intermittently or permanently breaking the electric circuit through the heating elements when predetermined temperatures are reached within the cooker, as will hereinafter be described.

By referring to Fig. 1, it will be seen that 70 the thermostat is mounted within a chamber 20 and that this chamber is insulated from the radiating heat of the elements 3 and 4 by means of a lower air chamber 5' and an annular heat-insulating ring 6. The 75 thermostat thus insulated is, practically speaking, only affected by the temperature obtained within the receptacle. The thermostat B is, in this instance, constructed on the thermopile principle and may consist 80 of one or more disks 7 of the character here shown. The disk shown is secured to a raised portion 8, formed in the bottom of the receptacle, and attached to said disk is a downwardly projecting rod 9 which is provided for the purpose of actuating a lever 10, pivotally mounted, as at 11, in a standard 12, secured in the bottom of the base section.

The lever proper is normally held in the 90 position shown in Fig. 1 by means of a spring 13, and its position is changed only when the thermostat expands and the rod 9 engages with an adjusting screw 14 secured in the end of the lever.

Mounted beyond the outer end of the arm 10 is a standard 15, upon which is turnably mounted a sleeve 16. Mounted on one end of the sleeve is an upper disk 17, provided with a plurality of downwardly projecting cam members 18, and secured near the lower end of the sleeve is a similar disk 19 provided with a plurality of upwardly projecting cam members 20. The diameter of the disks 17 and 19 and the position of the cams 18 and 20 are such that engagement will be made with the outer end of the arm 10, as will hereinafter be described.

Journaled at one end in the standard 15 and at the opposite end in the side of the base 2, is a horizontally disposed shaft 21, on the outer end of which is secured a lever 22 mov-

able with relation to a dial 23 and a stop lug 24. Secured on the inner end of the shaft is a bevel gear 25, and intermeshing with said gear is a horizontally positioned bevel gear 26, which is secured to the sleeve 16 to turn in unison with the cam disks 17 and 19. Surrounding the shaft 21 is a coil spring 27. One end of this spring is secured to the gear 25, while the opposite end is secured to the side of the base 2. This spring is secured in the manner shown so as to permit it to be wound when lever 22 is turned downwardly into engagement with the stop plug 32.

Secured on the lower side of the cam disk 19 is a switch member 28, which is provided with a plurality of outwardly projecting blades 29. This switch member is insulated from the cam disk 19, the sleeve 16 and the standard 15 upon which it is turnably mounted and is provided for the purpose of establishing a circuit between the knife switch, indicated at 30, and a switch member 31. One terminal of the main heating element, indicated at 3, is connected with a switch plug of suitable construction, shown at 32, by means of a wire 33, while the other terminal of the heating element is connected with a switch member 31, through a wire 34, and then by means of a wire 35 which is connected at one end to the knife switch 30 and at the opposite end to the plug 32; the switch member interposed between the wires 34 and 35 being provided for the purpose of making or breaking the circuit through the element, as will hereinafter be described.

In operation, with the receptacle A filled, it is only necessary to turn the lever 22 anticlockwise until it engages with the stop lug 24. This causes the shaft 21 to turn and simultaneously the gears 25 and 26, with connected sleeve 16 and attached cam disks 17 and 19, together with the switch member 28. A complete turn of the lever 22 into engagement with the lug will bring the switch member 28 to a position where one of the projecting blades 29 will engage the knife switch 30, thus closing a circuit through the main heating element 3 and the plug 32.

The switch mechanism will now remain stationary and the current will continue flowing through the element 3 until the temperature of the contents within the receptacle A has reached the boiling point, or any temperature desired. The thermostat B insulated from the heating element, as previously described, gradually expands as the temperature in the receptacle rises but will not trip the lever 10 until the desired temperature is reached within the receptacle A as it is actuated entirely by this temperature. Expansion of the thermopile 7 will cause the rod 9 to move in a downward direction

and engage the set-screw 14, causing this end of the lever to become depressed and the opposite end of the lever to rise with relation to a contacting cam member 20 formed on the lower disk 19. The lever will continue rising until it moves out of engagement with this cam member and will, therefore, release both the upper and the lower disks which will now turn about the standard 15, due to the tension of the spring 27, until the succeeding cam member 18, on the upper disk, engages the outer end of the lever.

The blade projection 29, previously in engagement with the knife switch 30, is thus released and the circuit through the element is broken. The contents of the receptacle A will thus have a tendency to cool to a certain extent, thus permitting the thermopile to contract and the rod 9 to move out of engagement with the set-screw 14. The spring 13 engaging with the lever 10 has, however, sufficient tension to depress the outer end of the lever 10, thus maintaining an engagement between the set-screw 14 and the rod 9 and similarly moving the arm out of engagement with the lug 18. The co-operating disks 17 and 19 are thus again released and will turn about the standard 15 until the second cam member 20 is engaged.

In the present instance it will be seen that each disk 17 and 19 is provided with four cam members and also that the switch member 28 is provided with four projecting blades 29. These blades are mounted in alignment with the cam members 20 formed on the lower disk. It can, therefore, be seen that the circuit through the element will be closed when the lever 10 is moved into engagement with the lower cam members and that the circuit is broken when the lever is moved to engage with the upper cam members. The circuit through the heating element 3 is thus opened and closed three times after the contents of the receptacle is first brought to a boiling point and that the cam disk provided merely acts as an escapement to control the position of the switch member 28 and that the thermostat B, controlled by the temperature within the receptacle, actuates and times the movement of the escapement.

If it is desired to prevent the temperature within the receptacle from dropping too rapidly, or, in other words, prevent the contents from cooling after same has once been brought to boiling point, it is possible to employ the auxiliary heating element indicated at 4. The circuit through this element is established by providing the contact member indicated at 40. This member is carried by the lower cam disk 19, but is insulated therefrom. One end of the blade 40 is adapted to engage with a wipe contact 41, while the other end engages with the knife

switch 30. One of the terminal wires of the element 4 is, therefore, connected with the plug 32 through a wire 42, while the other terminal is connected through another wire 43 with the wipe contact 41, which in turn establishes a circuit through the wire 35 and plug 32, when the blade 40 moves into position, as shown in Fig. 1; this position being assumed when the cam disks have returned 10 to normal position, or, in other words, when the lever 22 has returned to zero position as far as the indicator is concerned. Any desired temperature, as far as the contents of the receptacle is concerned, may thus be 15 maintained indefinitely or until the circuit is finally broken by removing the plug 32.

By referring to Figs. 1 and 2, it will be seen that a trip lever 45 has been provided. One end of this lever extends through the 20 base while the other end engages with the lower side of the arm 10. This trip lever is provided for the purpose of raising and lowering the arm 10, or, in other words, to operate the escapement if it is desired to 25 turn it to raised position without relying upon the normal action of the thermopile 7.

By referring to Fig. 3, which, in principle, is the same as the mechanism just described, it will be seen that the circuit through the 30 heating element is permanently broken when the boiling point or any predetermined point is reached within the receptacle. The switch mechanism actuated by the thermostat consists of an arm 50 pivotally mounted in the 35 standard 51. This arm is actuated by the thermostat in a manner similar to the arm 10 described in connection with Figs. 1 and 2. The outer end of the arm 50 is in this instance provided with a hook-shaped ex- 40 tension which is adapted to engage with a similarly shaped extension formed on the sliding bar 52 carried by the standards 53. The sliding bar is normally held out of engagement with the arm 50 by the tension of 45 a spring 54, thus maintaining the members of the knife switch, indicated at 55, out of engagement and breaking the circuit through the heating element.

In connection with the switch arrange- 50 ment here shown it will be seen that the thermostat is inclosed by a chamber or box 56 which projects a considerable distance up within the receptacle. This is of im- 55 portance as it positively prevents the ther- mostat from being actuated by the heat of the elements.

The illustration shown in Fig. 4 is prac- 60 tically the same as the device shown in Figs. 1 and 2, with the exception that the cooking receptacle is entirely removed. The heat insulating ring 6 is, furthermore, carried through the base, thus forming a cavity 60 for the reception of the thermostat and forming a positive insulation between the heating elements and the thermostat. Any

article, such as an iron, cooking receptacle, etc., may be placed upon the annular ring plate, indicated at 61, and the final temperature to which the object is heated is radiated through the said object to affect the 70 thermostat B.

The device shown in Fig. 4 may, in actual practice, prove the most desirable construction as it permits of a more general use than the device shown in Fig. 1 which is practically limited to the boiling of coffee or other liquid foods; while the device shown in Fig. 4 may be used for practically any purpose where heat is required. The particular form of thermostat employed in either device does 75 not form any part of the invention as it is obvious that any suitable form may be employed which is sufficiently sensitive to be actuated by the heat obtained within the receptacle. 80

The device as a whole is simple and substantial in construction, may be used for general heating or cooking purposes, and is so constructed that the circuit through the heating element may either be permanently 85 broken when a predetermined temperature is secured or may be intermittently broken any desired number of times after a predetermined temperature has first been reached. This can easily be understood by referring 90 to either Figs. 1 or 4, as it is possible to employ any number of projecting cam members, thus making it possible to make or break the circuit as many times as desired. 95

The materials and finish of the several 100 parts of the device are such as the experience and judgment of the manufacturer may dictate.

I wish it understood that various changes 105 in form, proportions and minor details of construction may be resorted to within the scope of the appended claims, and that I do not wish to limit myself to the specific design and construction here shown.

Having thus described my invention, what 110 I claim and desire to secure by Letters Patent is—

1. In a cooker, a receptacle, means for heating the contents of the receptacle until a predetermined temperature is obtained, 115 and means actuated by said temperature for turning off and on the heat a predetermined number of times.

2. In a cooker, a receptacle, means for heating the contents of the receptacle until a predetermined temperature is obtained, 120 and means for intermittently turning off and on the heat a predetermined number of times after a predetermined temperature is obtained within the receptacle.

3. In a cooker, a receptacle, an electric heating element adapted to heat the receptacle, a switch adapted to intermittently open and close a circuit through the heating element, and a thermostat actuated by 125

the temperature within the receptacle adapted to intermittently operate the switch to open and close the circuit through the heating element a predetermined number of 5 times.

4. The combination with an electrically heated fluid receptacle, of a thermostatic means to actuate an intermittent circuit control mechanism when the boiling temperature 10 has been reached by the contents of the receptacle and before appreciable evaporation has occurred, said thermostatic means being actuated by the temperature of the contents of the receptacle and independent 15 of the temperature of the heating element.

5. In a cooker, a receptacle, an electric heating element adapted to heat the receptacle, a revolving switch member adapted to intermittently close and open a circuit 20 through the heating element, and a thermostat adapted to control the revolving movement of the switch.

6. In a cooker, a receptacle, an electric heating element adapted to heat the receptacle, a revolving switch member adapted to intermittently close and open a circuit 25 through the heating element, an escapement mechanism connected with the switch to cause a step by step rotation of the switch, 30 and a thermostat controlling the movement of the escapement.

7. In a cooker, a receptacle, an electric heating element adapted to heat the receptacle, a revolving switch member adapted to 35 intermittently close and open a circuit through the heating element, an escapement mechanism connected with the switch to

cause a step by step rotation of the switch, and a thermostat actuated by the temperature obtained within the receptacle controlling 40 the movement of the escapement.

8. In a cooker, an electric heater comprising an insulating ring, and a heating element mounted within said ring, a cooking receptacle mounted above said ring and 45 adapted to be heated by said heating element, said insulating ring being provided with an air chamber, a thermostat mounted above said air chamber and insulated thereby from the heat of said heating element, 50 and a switch controlled by said thermostat under the influence of the heat in said receptacle.

9. In a cooker, an electric heater comprising a main heating element and an auxiliary heating element, a switch adapted to close a circuit through said heating elements, 55 thermostatic means controlled by the heat generated by said heating elements for permitting the operation of said switch to make 60 and break the circuit of said main heating element a predetermined number of times, and means carried by said switch for closing a circuit through the auxiliary heating element when the circuit through the main 65 heating element has been broken a predetermined number of times.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN F. NEWSOM.

Witnesses:

W. W. HEALEY,
THOS. CASTBERG.

C. E. STAHL.
ELECTRIC SWITCH.
APPLICATION FILED SEPT. 6, 1919.

1,372,207.

Patented Mar. 22, 1921.

Fig. 1.

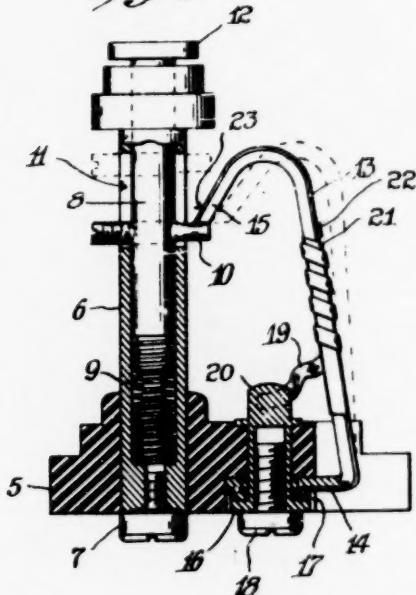


Fig. 2.

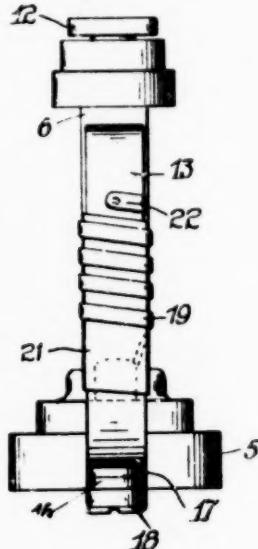
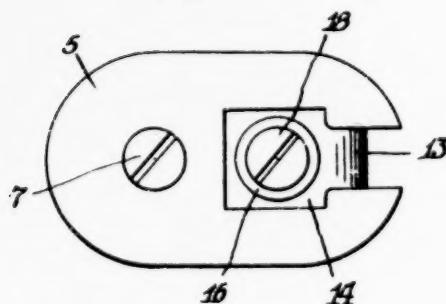


Fig. 3.



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Eden Prairie*

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UNITED STATES PATENT OFFICE.

CHARLES E. STAHL, OF MERIDEN, CONNECTICUT, ASSIGNOR TO THE CONNECTICUT TELEPHONE & ELECTRIC COMPANY, INCORPORATED, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ELECTRIC SWITCH.

1,372,207.

Specification of Letters Patent.

Patented Mar. 22, 1921.

Application filed September 6, 1919. Serial No. 322,107.

To all whom it may concern:

Be it known that I, CHARLES E. STAHL, a citizen of the United States of America, residing at Meriden, Connecticut, have invented a new and useful Electric Switch, of which the following is a specification.

My invention relates particularly to thermostatic switches.

The main object is to provide a simple but reliable mechanism which is compact and durable, sensitive yet positive in its automatic release and adapted to be readily reset.

In its preferred form the thermostatic member has a hook-like end whereby the movement of the contact end with relation to the other contact is very slight during the ordinary operation of the system in which the switch is installed, but in which the effective movement of the contact end is more abrupt at higher temperatures. The other contact member in the preferred form consists of an adjustable pin carried by a spring pressed plunger which is adapted to be manually reset after automatic release. The relative movement of the contact pin and the thermostatic element is such that in breaking the circuit any arc which may be formed is drawn across surfaces other than the surfaces which are in contact during current-carrying conditions. Furthermore, the resetting of the device cleans off the surfaces over which the arc is drawn.

Figure 1 is a side view and partial section of a device embodying my invention, showing the parts in full lines in their current-carrying or closed-circuit relation and indicating in dotted lines the position of the contact members when the circuit is opened.

Fig. 2 is an edge view of the same.

Fig. 3 is a bottom plan view.

In this particular form the base 5 is of insulating material in which is molded the tubular post 6 with which one of the circuit wires may be connected by a binding screw 7. In this post is mounted a plunger 8 which is pressed upward by a spring 9. From this plunger extends a contact pin 10 which is preferably adjustable through the plunger. This pin is adapted to travel in the slot 11 of the post 6. The plunger

is preferably provided with a button 12 at its outer end for pushing the plunger in.

The thermostatic element 13 may be formed of suitable material adapted to be bent or warped by heat. The lower end of this is bent to form a foot 14 which is seated in a recess in the base 5 and the outer end is bent into a hook-like form at 15 to engage the contact pin 10. The foot may be secured in position by a stud 16 which however is insulated from it by a washer 17. A binding screw 18 co-acts with the stud 16 at one end and a resistance strip or wire 19 is electrically connected to the other end 20. This strip 19 is wound around the main arm of the thermostatic member, being insulated therefrom by a layer of insulating material 21 throughout most of its length 70 and electrically connected at 22.

In the position shown in full lines in the drawing the circuit extends from the binding screw 7 through the tubular post 6, plunger 8, contact pin 10, contact tip 15, 75 the upper end of the arm 13, coiled strip 19 and the stud 16 to the binding screw 18.

As current flows through the switch, the coil 19 heats up the thermostatic arm 13 and causes its upper end to move away from the post 6. At the same time the contact tip 15 moves toward the post although to a somewhat less extent due to the fact that the tip is shorter and the heat is more concentrated in that part of the arm which is surrounded by the coil 19. The parts are so proportioned that at the higher temperatures the radiation from the contact tip 15 is so rapid that the end moves but little relatively to the main body of the thermostatic element (the radiation of course being more rapid at higher temperatures). At the higher temperatures therefore, the movement of the contact tip 15 toward the right is substantially identical with the movement 95 of the main arm 13 and consequently the contact tip is moved quickly away from the contact pin 10 at the time when it is desired that the circuit shall open automatically.

In the circuit-opening movement any arc 100 which is formed will be drawn across the outer end of the contact pin 10 and along the inclined face 23 of the tip of the thermostatic element. The resetting of the switch

when the upper end of the thermostatic element moves back toward the post will cause the outer end of the contact pin 10 to slide down the incline 23, thus scraping 5 the contact element where the arc was formed and keeping the surface bright.

By screwing the pin in or out of the plunger the switch may be adjusted to open at different temperatures.

10 I claim:—

1. In an electric switch, an insulating base, a tubular post carried thereby, a spring pressed plunger operable in said post, a pin projecting from said plunger, a ther-

15 mostatic element having a main arm mounted alongside of said post and having its tip end engaging the outer face of said pin.

2. In an electric switch, a longitudinally movable member having a transversely ex-

20 tending contact pin, a thermostatic element mounted alongside of said member and having its tip end engaging the outer surface of said pin, the outer wall of said thermostatic element being inclined relative 25 to the direction of movement of said pin.

3. In an electric switch, an insulating base, a tubular post carried thereby, a plunger movable in said post, an adjustable contact member carried by said plunger and a 30 thermostatic arm secured to said base and having a reversely extending end engaging said contact member.

4. In an electric switch, an insulating base, a tubular post carried thereby, a spring 35 pressed plunger reciprocable in said post, a transversely adjustable contact member carried by said post, said plunger being adapted to be set by hand, a thermostatic element secured to said base and having a reversely 40 extending contact tip engaging the outer face of said adjustable contact member, and a resistance coil for heating a part of said thermostatic element.

5. In an electric switch, a spring pressed 45 reciprocal contact, a thermostatic arm arranged adjacent thereto and having a reversely extending contact tip normally engaging said contact, and means for heating a part of said thermostatic element where- 50 by a differential action of the contact tip with respect to the remainder of the ther-

mostatic arm is effected at certain temperatures and the contact tip moves at substantially the same rate as the remainder of the thermostatic arm at higher temperatures. 55

6. In an electric switch, a spring pressed contact member, a thermostatic arm having its free end extending in the opposite direction to the main portion thereof and adapted to engage said contact member to conduct 60 current therethrough under normal conditions, and means for heating the main portion of said arm so as to move it away from said contact and at the same time move its end toward said contact to avoid breaking 65 the circuit over a certain range of temperatures, the proportions of the parts of said arm and its end being such that its end moves with the main part at temperatures above a predetermined value. 70

7. In an electric switch, a spring pressed member having a shoulder, a thermostatic arm having its free end extending in the opposite direction to the main portion of said arm and normally engaging said shoulder, 75 and a coil surrounding only a portion of said arm whereby the thermostatic movement of the free end of said arm over a certain range of temperatures is in a direction opposite to the movement of the main portion of said arm, so as, during said range, to retain engagement with said shoulder, and whereby radiation from the end of said arm at higher temperatures causes a differential movement between the main portion and the end of 80 said arm so as to cause the end of said arm to be disengaged from said shoulder.

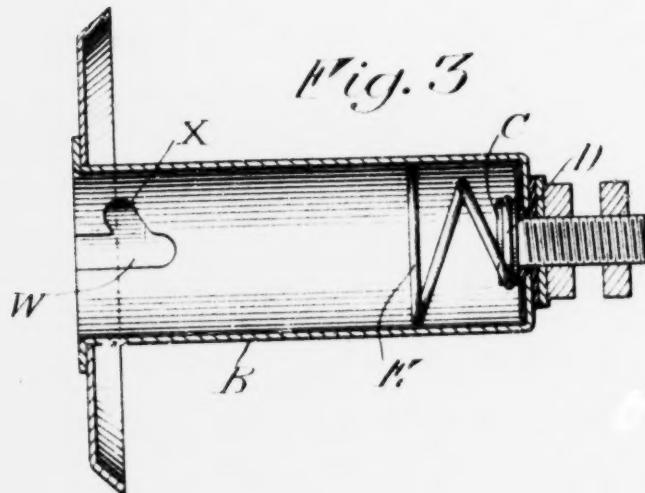
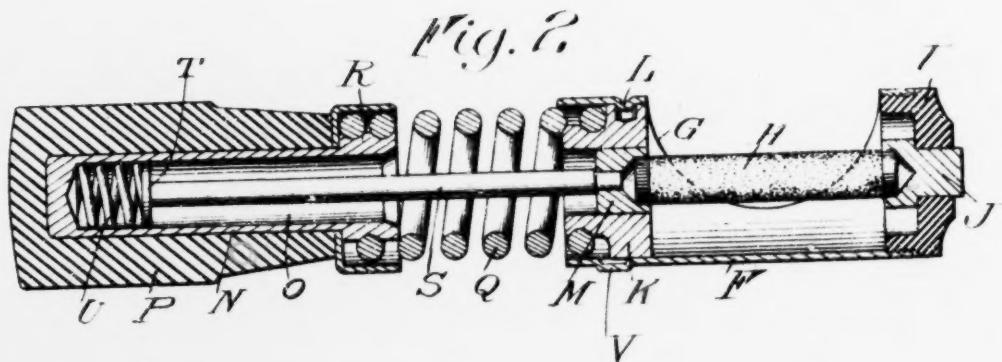
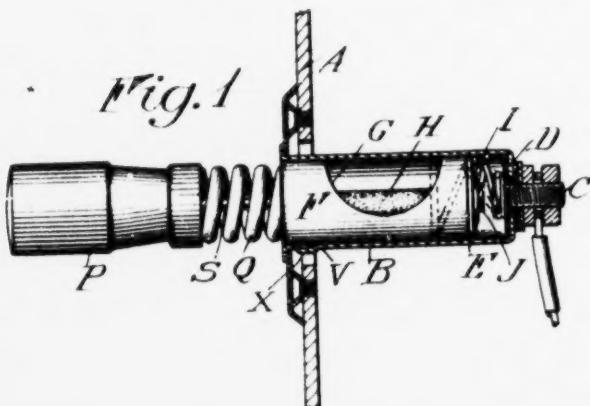
8. In an electric switch, a spring pressed member having a shoulder, means for manually moving said member and shoulder 90 against the pressure of said spring, a thermostatic arm arranged alongside of said spring pressed member and having its free end extending in the opposite direction to the main portion of said arm and adapted to 95 engage said shoulder, and a heating coil surrounding a portion of the main arm only, whereby there is permitted a differential thermostatic action between the main portion of said arm and the end thereof.

CHARLES E. STAHL.

1,373,583.

F. A. ADAMS.
CIGAR LIGHTING DEVICE.
APPLICATION FILED AUG. 20, 1919.

Patented Apr. 5, 1921.



INVENTOR
Frank A. Adams
BY
Harold E. Stonebraker
ATTORNEY

UNITED STATES PATENT OFFICE.

FRANK A. ADAMS, OF ROCHESTER, NEW YORK, ASSIGNOR TO SHUR PRODUCTS, INC., OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

CIGAR-LIGHTING DEVICE.

1,373,583.

Specification of Letters Patent.

Patented Apr. 5, 1921.

Application filed August 20, 1919. Serial No. 318,800.

To all whom it may concern:

Be it known that I, FRANK A. ADAMS, a citizen of the United States of America, residing in Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Cigar-Lighting Devices, of which the following is a specification.

My invention relates to electrically heated devices, more particularly of the type including a heating unit that is insertible into and removable from a socket, the unit being inserted to close an electric circuit and to heat it to the required degree, after which it can be removed and used. An instance of one practical application of the invention is an electric cigar lighter, adapted for use on automobiles, and one of the purposes of the improvement is to improve such structures so that the device can be handled without danger of burning the user.

More particularly, the object of the invention is to afford heat insulating or heat dissipating means between the electrical heating unit and the handle by which it is held, so as to prevent the handle from becoming excessively heated. A further purpose is to accomplish this without making a bulky or clumsy device, as it is important for such purposes as automobile cigar lighters that the contrivance be compact and easy to handle, and that it requires little space when not in use.

Another object of the invention is to improve the construction of the heating unit, so as to bring about quick and uniform heating with the least amount of electrical energy.

Still an additional object of the invention is to construct a socket, into which the heating unit is inserted, in such a way as to render the closing of the circuit and withdrawal of the heating unit, a simple and at the same time certain operation.

The invention also accomplishes other purposes as will appear from the following detailed description and the accompanying drawing, in which:

Figure 1 is a side elevation, partly in section, showing the heating unit in its normal position in the socket, with the circuit open:

Fig. 2 is an enlarged sectional view of the heating unit and handle portion, and

Fig. 3 is an enlarged sectional view of the socket.

The structure herein disclosed is intended merely as illustrative of the invention, and not as confining it within the limits of the details of the drawings, and while I will describe what I have found to be a preferred embodiment, there are other means which can be designed to accomplish the same ends.

Referring more particularly to the drawings, A designates the instrument board of an automobile or vehicle, provided with the socket B which has an electrical terminal C at its inner end. The terminal C is in the form of a screw, having a head with an insulating bushing, the latter provided with a peripheral groove, which receives the small end D of a conical spring, the larger end E of which is freely movable within the socket B to engage the heating unit. The large end E of the spring is preferably slightly less in size than the inner diameter of the socket, so that the wall of the socket forms a guide for the spring and prevents it from moving unevenly or becoming improperly positioned.

The heating unit comprising a cylindrical housing F, which is cutaway at G to afford access to a carbon element H. The housing F has a head I at one end formed of any suitable insulating material, and with a central opening in which is secured a metallic contact J which engages the terminal C when inserted within the socket B. The other end of the housing F is provided interiorly with a metallic collar K, the housing being attached thereto by a projection L stamped inwardly to engage a recess in the collar. The collar K has a central opening and receives a metal contact member M which engages the adjacent end of the carbon element H. The ends of the carbon element H are tapered or conical, and engage correspondingly shaped recesses in the contact blocks J and M. Each end of the carbon element is coated with a layer of conducting material such as copper which is substantially co-extensive with the surface that is engaged by the contact. The copper coating is preferably obtained by dipping the carbon element in a copper solution, and serves to bring about an intimate electrical contact, causing the current to travel toward the center of the carbon quickly and uniformly and thus heating the carbon in a minimum time.

The handle portion comprises a hollow

cylindrical member N, affording a chamber O and surrounding the cylinder N is a handle proper, designated by P, and consisting of any suitable material such as what is commercially known as "bakelite." Arranged between the handle and heating unit is a heat insulating or heat dissipating means, and to accomplish this, I preferably attach the handle portion to the heating unit by connecting means that prevents the hand engaging portion P from becoming excessively heated. This is accomplished in my preferred arrangement, by a metallic coil Q, one end of which is attached to the collar K by engaging a threaded portion thereon, and the other end of which engages a threaded portion on an enlargement R of the cylinder N. This arrangement affords a substantial air space between the handle and heating unit for cooling the handle.

The contact M is preferably in yieldable engagement with the carbon element, and this is accomplished by attaching to the contact M a rod S which extends into the chamber O. At its opposite end, the rod S is provided with a head T, which is engaged by a spring U arranged within the chamber, and acting to maintain the contact in engagement with the carbon element.

The housing F is provided with a boss or enlargement V coöperating with a slot in the socket F. Said slot includes a longitudinal portion W and a transverse portion X, which extends laterally from the longitudinal portion W and is inclined toward the outer end of the socket. The purpose of the inclined lateral slot or cutaway portion is to lock the heating unit in the socket when not in use, and the inclined inner wall of the cutaway portion X permits of closing the circuit to the heating unit by merely pushing in on the handle. Such inward pressure forces the boss V against the inclined wall of the slot X and thereby rotates the heating unit until the boss V is in line with the longitudinal portion, and further pressure moves it longitudinally and closes the circuit. It will be understood that the spring E holds the boss V against the end of the slot X when not in use, and to operate the device, the heating unit is forced inwardly against the action of spring E until contact J engages the terminal C for a sufficient length of time to heat the carbon element H. The heating unit is then withdrawn to light a cigar or cigarette, which is inserted through the cutaway portion G to engage the heated carbon. The electrical circuit is completed by grounding through the collar K, housing F, and instrument board A.

While I have described a particular form of the invention, it is to be understood that it is susceptible of modifications, without departing from the fundamental concept of

the improvement, as set forth in the following claims.

I claim:

1. The combination with an electrical heating unit, of a handle portion independent of the heating unit, and a coil separate and independent from the handle portion and connecting the handle portion and said unit.

2. The combination with an electrical heating unit, of a handle portion independent of the heating unit, and a metallic coil having one end attached to said unit and its opposite end attached to the handle portion, said coil being separate and independent from the handle portion.

3. The combination with an electrical heating unit, comprising a carbon element, of a handle portion having a chamber therein, a metallic coil connecting said heating unit and handle portions, a movable contact engaging one end of the carbon element, a rod passing through said coil with one end engaging said movable contact and the opposite end entering said chamber in the handle portion, and means within the chamber actuating said rod and movable contact toward the carbon element.

4. The combination with an electrical heating unit comprising a carbon element, of a handle portion having a chamber therein, heat non-conducting connecting means between the handle portion and said unit, a movable contact engaging one end of the carbon element, a rod with one end secured to said movable contact and having its opposite end within said chamber, and means within the chamber actuating said rod and movable contact toward the carbon element.

5. The combination with an electrical heating unit, of a socket therefor, and a conical spring having its smaller end secured to the base of the socket and its larger end movable within the socket to engage said unit.

6. The combination with an electrical heating unit having a boss at one side thereof, of a socket having a cutaway portion to receive said boss, said cutaway portion embodying an opening extending longitudinally of the socket, and a transverse locking opening extending laterally from the longitudinal opening and inclined toward the open end of the socket.

7. The combination with an electrical heating unit, of a handle portion arranged in close proximity to the heating unit and independently thereof, and connecting means between the handle portion and heating unit, said connecting means serving to support the handle portion and to prevent it from becoming excessively heated through proximity to the heating unit.

8. The combination with an electrical

heating unit, of a handle portion arranged in close proximity to the heating unit and independent thereof, and a connection between the heating unit and the handle portion, said connection serving to support the handle portion and being of such form as to cause heat passing from the heating unit to the handle portion to travel over a relatively long path whereby such heat is substantially dissipated before reaching the handle portion.

9. The combination with an electric heating unit, of a handle portion arranged in

close proximity to the heating unit and independent thereof, and a metallic coil having one end attached to said unit and its opposite end attached to the handle portion, said coil being separate and independent from the handle portion and serving to prevent the latter from becoming excessively heated through proximity to the heating unit.

In witness whereof, I have hereunto signed my name.

FRANK A. ADAMS.

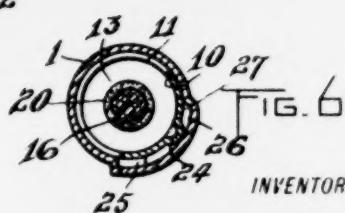
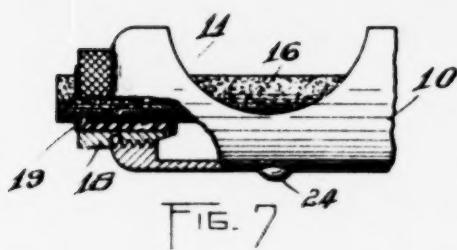
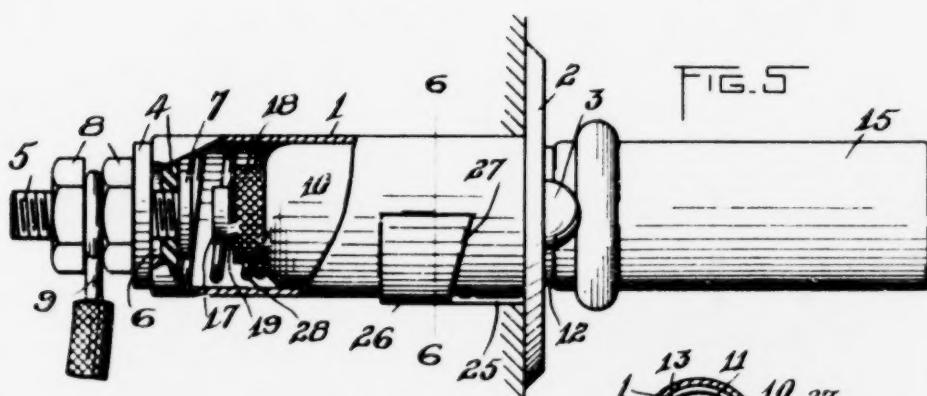
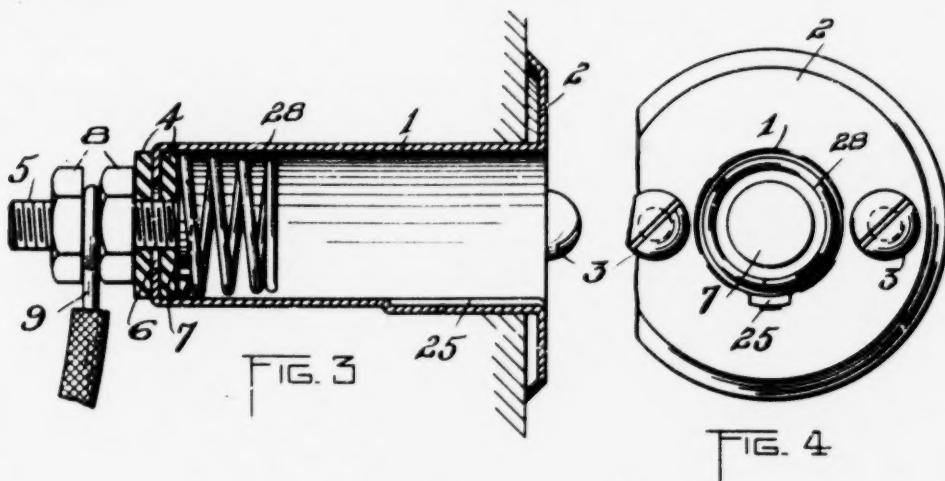
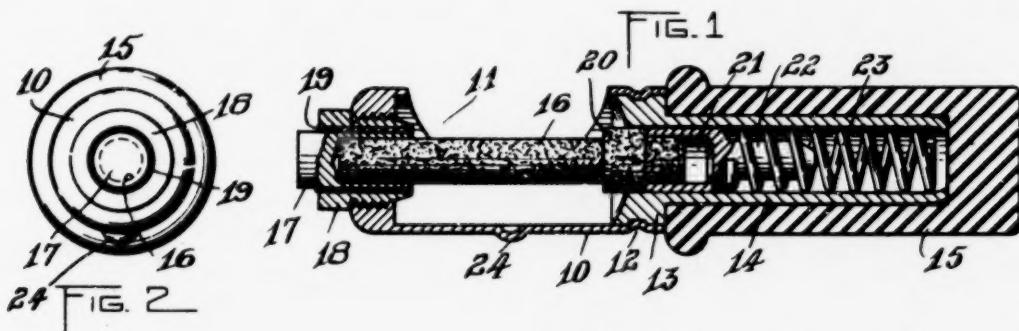
J. M. MORRIS.

ELECTRICAL LIGHTING DEVICE FOR CIGARS AND THE LIKE.

APPLICATION FILED OCT. 2, 1919.

1,376,154.

Patented Apr. 26, 1921.



Joshua M. Morris
BY
James T. Lemoine
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSHUA M. MORRIS, OF ROCHESTER, NEW YORK.

ELECTRICAL LIGHTING DEVICE FOR CIGARS AND THE LIKE.

1,376,154.

Specification of Letters Patent. Patented Apr. 26, 1921.

Application filed October 2, 1919. Serial No. 328,041.

To all whom it may concern:

Be it known that I, JOSHUA M. MORRIS, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Electrical Lighting Devices for Cigars and the like, of which the following is a specification.

The present invention relates to an electrical lighting device of the type in which an incandescent element is employed for lighting cigars, tobacco or the like, an object of this invention being to provide a device in which the incandescing element is mounted upon a part which is removably connected to a stationary part through which the electricity is supplied to the incandescing element, thus permitting the latter to be connected to or disconnected from the electrical current.

To this and other ends, the invention consists of certain parts and combinations of parts, all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings:

Figure 1 is a longitudinal section through the removable member of the device;

Fig. 2 is an end view of the removable member;

Fig. 3 is a longitudinal section through the stationary or socket member of the device;

Fig. 4 is a fragmentary view of one end of the socket member;

Fig. 5 is a view in side elevation and partially in section showing the two members of the device connected;

Fig. 6 is a section on the line 6—6, Fig. 5; and

Fig. 7 shows a fragmentary view partially in section in which the incandescing element is extended through one end of the removable member in order that the device may be used for lighting a pipe.

In the illustrated embodiment of the invention there is employed a stationary member which may be attached to any suitable support such for instance as the dash board of an automobile and removably connected to this stationary part or member is a member by which the incandescing body is carried, said removable member being adapted for connection with the stationary member for the purpose of heating the incandescing

element or body to incandescence after which the removable part is disconnected from the stationary part and is employed for lighting a cigar.

The stationary part in this instance is in the form of a socket member 1 adapted to be fitted in an opening in the dash board of an automobile and having its open end in this instance formed with a flange 2 secured by screws 3 to the dash board. The dash board of an automobile is ordinarily grounded and as a consequence the socket 1 which is metallic and forms one of the terminals of the stationary part is likewise grounded. The other terminal of the stationary part is in this instance formed by a head 7 of a screw 5 which extends through an opening 6 in the inner end of the socket member 1. Two insulating washers 4, one on the inside of the socket member and the other on the outside, insulate the terminal 7 from the socket 1. Nuts 8 on the screw 5 hold the terminal 7 to the socket member and in addition serve for securing the conductor wire 9 which preferably leads from the battery.

The removable member of the lighter comprises in this instance a hollow plug 10, one side wall of which is formed with a lateral opening 11. This hollow plug is spun at 12 at its inner end about an enlargement 13 on a sleeve or tube 14 which fits within an insulating cap 15 serving as the handle for the hollow plug, the insulating cap abutting the enlargement 13 of the sleeve 14. Within the hollow plug 10 an incandescing element 16 is arranged preferably in the form of a high resistance carbon. In this instance, one end of this carbon rod projects into a socket in a terminal piece 17 which is arranged within a bushing 18 that is secured in the end of the plug, an insulating sleeve 19 being arranged between the bushing 18 and the terminal 17. The other end of this carbon or incandescing rod 16 abuts a plug 20 of low resistance carbon fitted in a socket 21 that is formed in the plunger 22 which operates within the sleeve 14, a spring 23 also being arranged in the sleeve and acting on the plunger 22 to hold the low resistance carbon 20 against the high resistance carbon or incandescing element 16. Instead of employing the terminal 17, the incandescing member 16 may be extended through the insulating sleeve 19 to 110

project from the end of the bushing as shown in Fig. 7, this construction being designed for lighting pipes.

It is preferred to provide some means normally for holding the incandescent element 16 out of electrical connection with the terminal 7 and to this end a helical spring 28 may be arranged within the socket member 1 to coöperate with the removable plug 10 about the bushing 18 in the manner shown in Fig. 5, thus holding the terminal 17 out of electrical connection with the terminal 7. If the plug or removable member be pushed inwardly against the spring 28, the terminals 7 and 17 will be brought into engagement and, in this way, the current will flow through the incandescent element 16, thus heating the latter to the point of incandescence after which the removable member is withdrawn from the socket member and a cigar may be lighted by introducing it into engagement with the incandescent member 16 through the opening 11 in the side of the plug or tubular terminal 10. Of course, with a pipe, the construction shown in Fig. 7 is used in which instance the end of the incandescent element 16 is introduced into the pipe.

It is desirable to interlock the removable plug with the socket member and to this end the plug is provided on one side with a projection 24 which is pressed up from the metal of the tubular terminal 10 and is adapted to be passed into a longitudinally formed groove 25 in the inner face of the socket member, this groove 25 communicating with a laterally extending groove 26 in the socket member, the wall 27 of said groove 26 nearest the open end of the socket being inclined so that as the projection 24 enters the laterally extending groove, it will, under the action of the spring 28, be held against the inclined wall 27 at the outer end of the lateral groove 26, the friction between the projection 24 and the inclined wall 27 being sufficient to prevent the removable plug being accidentally disconnected from the stationary socket member, yet at the same time the lateral groove 26 is of sufficient width to permit the plug to be moved inwardly in order that its terminal 17 may be brought into contact with the terminal 7 at the inner end of the socket member.

From the foregoing it will be seen that there has been provided a lighting device which may be attached to any suitable support such for instance as the dash of an automobile. This lighting device has a stationary member preferably in the form of a socket, and a removable member, preferably in the form of a plug. The front face of the socket member is preferably substantially flush with the front face of the dash and the removable member or plug

carries an insulating handle and an incandescent element, the latter being adapted to be brought to incandescence when the plug is fitted in the socket in a certain position. Normally the plug, while positioned in the socket, has its incandescent element out of electrical connection. This element may be readily brought to incandescence by the movement of the plug axially against the action of the spring. This spring also serves for holding the plug interlocked with the socket member so that the vibration of the vehicle will not disconnect the plug from the socket member.

What I claim as my invention and desire to secure by Letters Patent is:

1. A lighting device comprising two members, one of which is stationary and is provided with two terminals and the other of which is provided with two terminals and an exposed incandescent device connecting said terminals, the two terminals of the first mentioned member being adapted to be engaged by the two terminals of the second mentioned member in order to conduct the current through the incandescent device, the second mentioned member being removable from the first mentioned member and having a position on the first mentioned member in which its two contacts will lie out of engagement with the two contacts of the first mentioned member, and a spring for holding said second mentioned member with its two contacts out of engagement with the two contacts of the first mentioned member, said spring being yieldable to permit the second mentioned member to be moved on the first mentioned member in order that the two contacts of the second mentioned member may be brought into engagement with the two contacts of the first mentioned member in order to bring the incandescent device to incandescence.

2. A lighting device comprising a socket member forming a terminal and having also another terminal, a member insertible in said socket member and having an exposed incandescent body adapted to be brought to incandescence when connected with the two terminals, said member having a position on the socket member in which the circuit through the incandescent body is broken, and a spring for holding said member on the socket out of electrical connection with one of the terminals of the socket so that the circuit is broken.

3. A lighting device comprising a stationary socket forming one terminal, a terminal arranged within said socket, a hollow terminal of conducting material having an opening in its side wall and adapted to be introduced in the socket, and an incandescent body arranged in said hollow terminal.

4. A lighting device comprising a stationary socket forming a terminal, a terminal ar-

ranged in the socket, a hollow terminal having an opening in its side wall and adapted to be introduced into said stationary socket, a terminal secured in the end of the hollow terminal to coöperate with the terminal in the socket, an incandescent body within the hollow terminal, and spring means acting on said incandescent body to hold it to the terminal at the end of the hollow terminal.

10. 5. A lighting device comprising a stationary socket forming one terminal, a terminal arranged within the socket, a hollow terminal having an opening in its side wall and adapted to be introduced into the stationary socket, an insulator arranged in the end of the hollow terminal, a terminal arranged in said insulator, an incandescent body having its end positioned in said insulator against the last named terminal, and a spring 20 pressed plunger acting on said incandescent body to hold it to the insulator.

6. A lighting device comprising a stationary socket forming a terminal, a terminal arranged within the socket, a hollow terminal having an opening in its side wall and adapted to be introduced into the stationary socket, a sleeve insulator arranged in the end of the hollow terminal, a terminal secured in said sleeve insulator to contact 25 with the terminal in the socket, an incandescent body having one end extending into said sleeve insulator and its other end connected with the hollow terminal.

7. A lighting device comprising a stationary socket forming a terminal, a terminal arranged in said socket, a spring arranged in the socket, a removable hollow terminal adapted to fit in the socket, and an incandescent body carried by said removable hollow terminal and adapted to be brought into electrical connection with the terminal in the stationary socket when the hollow terminal is moved to compress the spring.

8. A lighting device comprising a stationary socket forming one terminal, a terminal arranged within the socket, a spring arranged within the socket, a hollow terminal having an opening in its side wall and adapted to be introduced in said stationary

socket, a terminal insulated from the hollow terminal and arranged at the end of said terminal to contact with the terminal in the socket, and an incandescent element arranged in the hollow terminal to be exposed through the opening and electrically connected to the hollow terminal and the terminal in the end of the hollow terminal.

9. A lighting device comprising a stationary socket forming one terminal, a terminal arranged within the socket, a hollow terminal having an opening in its side wall and adapted to be introduced into said stationary socket, an insulator in the end of the hollow terminal, a terminal arranged in said insulator, an incandescent body projecting into said terminal, and a spring pressed plunger acting upon said incandescent body.

10. A lighting device comprising a stationary socket forming a terminal, a terminal arranged in said socket, a spring in the socket, a removable hollow terminal adapted to fit in the socket, an incandescent body carried by said removable hollow terminal and adapted to be brought into electrical connection with the terminal in the stationary socket when the hollow terminal is moved to compress the spring, and interlocking connections between the stationary socket and the removable hollow terminal controlled by said spring.

11. A lighting device comprising a stationary socket forming one terminal and having its inner wall provided with a longitudinally extending groove and a laterally extending groove leading from said longitudinally extending groove, a terminal arranged in said socket, a removable hollow terminal adapted to fit in the socket and provided with a projection adapted to operate in the longitudinally extending and laterally extending grooves, and an incandescent body carried by said removable hollow terminal and adapted to be brought into electrical connection with the terminal in the socket when the hollow terminal is moved longitudinally in the socket.

JOSHUA M. MORRIS.

A. ZECCHINI.

ELECTRIC LIGHTER.

APPLICATION FILED APR. 15, 1921.

1,437,701.

Patented Dec. 5, 1922.

2 SHEETS-SHEET 1.

Fig. 1

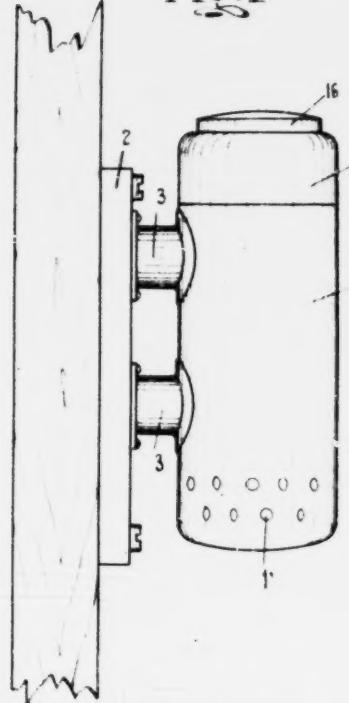


Fig. 3

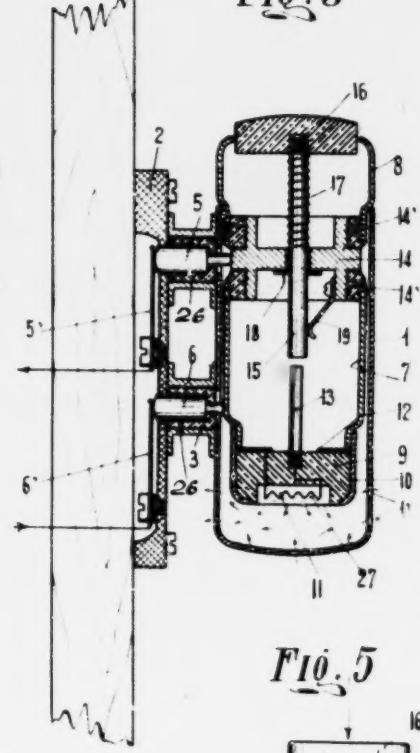


Fig. 2

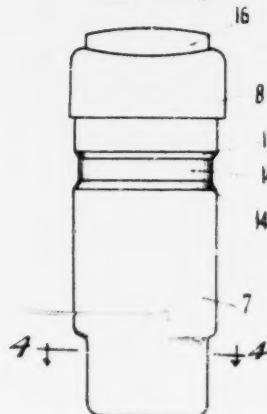
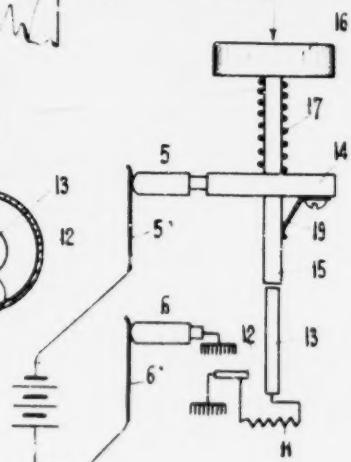


Fig. 4



Inventor:-

Alfredo Zecchini

By Lawrence Langner
Atty.

391

1,437,701.

A. ZECCHINI.
ELECTRIC LIGHTER.
APPLICATION FILED APR. 15, 1921.

Patented Dec. 5, 1922.

2 SHEETS—SHEET 2.

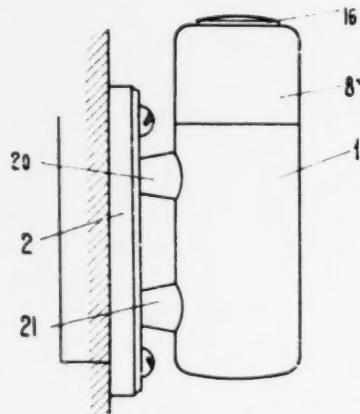


Fig. 6

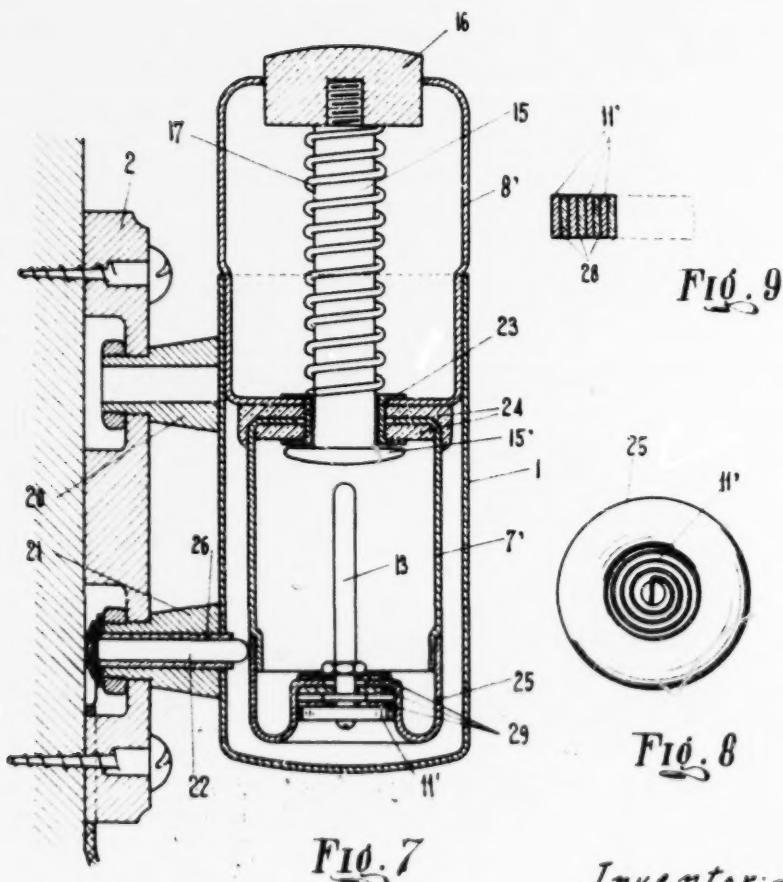


Fig. 7

Fig. 8

Inventor:
Alfredo Zecchini
By Lawrence Langner
Atty.

Patented Dec. 5, 1922.

1,437,701

UNITED STATES PATENT OFFICE.

ALFREDO ZECCHINI, OF TURIN, ITALY.

ELECTRIC LIGHTER.

Application filed April 15, 1921. Serial No. 461,580.

To all whom it may concern:

Be it known that I, ALFREDO ZECCHINI, a subject of the King of Italy, and resident of Turin, Italy, have invented certain new and useful Improvements in Electric Lighters (for which I have filed an application in Italy, April 26, 1920), of which the following is a specification.

This invention relates to electric lighters for cigars and the like.

This invention has for object a lighter comprising a plug which is provided with an ignition resistant member and with means for inserting this resistant member in and out of circuit of a source of current, said plug being removably located within a stationary socket having current feeding connections.

Further this invention comprises an arrangement for feeding the current to the ignition resistant member whereby the plug carrying said resistant member may be freely removed from its cooperating socket without any connecting wire being provided between said plug and socket, as well as an automatic switch which holds the circuit open when the device is not in use.

Finally this invention comprises a particular arrangement of the ignition resistant member and other useful features herein-after described and claimed.

The annexed drawings show by way of example two embodiments of the device according to this invention.

In said drawings Figure 1 is the side view of a device according to this invention in inoperative position; Figure 2 is a side view of the plug removed from the socket; Figure 3 is the central section of the device in inoperative position; Figure 4 is the section on line 4—4 of Figure 2; Figure 5 is a diagram of the electric circuit; Figure 6 is a side view of another construction of the device in inoperative position; Figure 7 is a central section of the same to an enlarged scale; Figure 8 is an end view of the removable plug showing the ignition resistant member; Figure 9 is a fragmentary transverse section of the resistant member made to an enlarged scale on line 9—9, Figure 8.

The device shown by Figures 1—3 comprises a socket 1 which is connected by means of hollow arms 3—3 to a plate 2 intended to be secured to a supporting wall. Within said arms 3—3 are located the pins 5—6 which are properly insulated by means

of bushings 26 and bear by one end against the spring contacts 5'—6' connected with the wires of the circuit of a source of current; the opposite ends of said pins project into the hollow of the socket 1.

The socket 1 is further provided with holes 1' for the circulation of air therethrough.

Within the socket 1 is removably located a metal plug comprising a grasping head 8 at the end intended to remain out of the socket 1 and heating means at its end entering said socket.

Said plug comprises a metal shell 7 having at one mouth a block 9 of insulating material secured on it by a sleeve 10 screwed on said shell; at its opposite mouth said shell 7 is secured to a partition 14 of conducting material carrying the head 8, insulating rings 14' being located between said partition 14 and the head 8 as well as the shell 7.

The refractory block 9 provides a front recess 27 in which is located a resistant wire 11 having one end connected to the sleeve 9 and shell 7 by means of a conducting washer 12; the opposite end of said wire 11 is connected to a stem 13 projecting centrally into the shell 7.

Said partition 14 has a smaller diameter than the shell 7 and head 8 so as to provide a circular groove, and has a central hole lined with a bushing 18 in which is mounted to slide endwise a central stem 15.

This stem 15 has one end opposite to the end of the stem 13 and its opposite end is provided with a knob 16 of insulating material which projects beyond the edge of the head 8.

A spring 17 bearing against the partition 14 and the knob 16 holds the stem 15 with its end removed from the opposite end of the stem 13; the electric connection of the stem 15 with the partition 14 is ensured by a brush 19 secured to said partition 14 and contacting with said stem.

The arrangement of the partition 14 within the plug is such as when the plug is inserted in the socket 1, the outer rim of the partition 14 contacts with the pin 5 and at the same time the pin 6 contacts with the surface of the shell 7.

The outer surface of the insulating ring 14' between the partition 14 and the shell 7, and the shape of the shell 7 in its portion under the pin 6 must be such that when the plug is removed from its socket the shell 7

leaves the pin 6 before the edge of the shell 7 under the lower ring 14' comes in contact with the pin 5, for the purpose of preventing the source of current from being short-circuited through said pins 5 and 6 and the metal body of the shell 7.

When the plug is inserted in the socket 1, as shown by Figure 3, the partition 14 and the stem 15 are electrically connected with the pin 5, and the washer 12 to which leads one end of the resistant wire 11 is electrically connected with the pin 6 through the metal body of the shell 7.

The circuit is therefore open, the opposite ends of the stems 15 and 13 being removed from each other and it is held open so long as the knob 16 is not depressed.

By depressing the knob 16 against the action of its associate spring 17 the stem 15 is carried in contact with stem 13 connected with one end of the resistant member 11 and therefore the current flows through this resistant member.

When it is desired to use the lighter the knob 16 is pushed down and is held in such a position for some time as necessary for causing the heat developed by the current to make the resistant wire incandescent; thereafter the head 8 is grasped and the plug 30 is removed from its socket the incandescent wire being then adapted to be used for lighting a cigar or the like.

The wire which is made incandescent by the passage of electric current keeps its high temperature for a time quite sufficient for the purpose of igniting a cigar or the like.

At the time the plug is being removed from the socket 1 the source of current is not liable to be short-circuited because the shell 40 7 leaves the pin 6 before coming into contact with the pin 5, as described.

The Figures 6 and 7 show a simplified embodiment of the lighter according to this invention in which the stationary socket 1 is connected to the plate 2 by an earthed arm 20 and by another hollow arm 21 within which is located a pin 22 insulated by a sleeve 26 and connected with one terminal of a source of current whose opposite terminal is earthed; the inner end of the pin 22 projects into the hollow of the socket 1.

The removable plug intended to be located within the socket 1 consists of two metal shells 7'-8'; the shell 7' has a smaller diameter than that of the hollow of the stationary socket 1 and a portion of the shell 8' has such a diameter as to fit in the socket 1. Said shells 7'-8' are connected at their adjacent ends by means of a conducting sleeve 23 having its edges upturned over the edges of the front walls of said shells, and are insulated from each other by insulating washers 24.

The shells 7'-8' are open at their other ends and the shell 7' carries an end cap 25

providing a space for the ignition resistant member 11'.

This resistant member (see Figures 8 and 9) consists of a strip 11' of a proper metal wound on a spiral together with an adjacent strip 28 of insulating and refractory material; the outer portion of said metal strip 11' contacts with the cap 25, whilst its inner end is electrically connected with a stem 13 concentric with the shell 7' and insulated from the cap 25 by means of insulating washers 29.

At the end mouth of the shell 8' is located the insulating knob 16 secured to a conducting stem 15 which passes through the sleeves 23; this rod is provided with a lower head 15' which is held by a spring 17 removed from the end of the stem 13.

When the parts are in the position shown by Figure 7 the circuit is cut out; by pushing down the knob 16 the stem 15 is lowered and its head 15' is carried into contact with that of the stem 13. Therefore the circuit of the source of current is closed between the pin 22 and the earthed arm 20 through the cap 25, resistant member 11', stems 13-15, sleeve 23, shell 8', one pole of the source being connected to the pin 22 and the other being earthed, as described.

Therefore the current flows through the 95 resistant member 11' and this latter is made incandescent so that when the plug is removed from the socket said resistant member may be used for purpose of lighting a cigar or the like.

The last described embodiment does not require the use of parts of refractory material; its assembly is made more easy and its size is reduced.

In this construction for avoiding the short-circuiting of the source of current it is sufficient that the portion of the shell 8' entering the socket 1 is longer than the portion of the shell 7' lying under the level of the pin 22 when the plug is in position in its 105 socket.

The resistant heating member consisting of a flat metal strip wound together with a strip of insulating material has the advantage that the whole part may be made of 115 a reduced size; therefore the heat is accumulated in a small body and the temperature of this latter is increased, so that it may be used for igniting a cigar or the like after the circuit of the resistance has been held closed long enough for heating it to the required degree.

What I claim as my invention and desire to secure by United States Letters Patent is:-

1. An electric lighter for cigars and the like, comprising a stationary member, feeding means in said member connected with the terminals of a current source, a removable member adapted to be engaged with and 130

separated from said stationary member, a heating resistant part in this removable member, conducting means in this removable member adapted to contact with said feeding means when said two members are engaged with each other, these conducting means being connected with the ends of said resistant part, and means controlling the circuit in which said resistant member is inserted.

10 2. An electric lighter for cigars and the like, comprising a stationary member, feeding means in said member connected with the terminals of a current source, a removable member adapted to be engaged with 15 and separated from said stationary member, a heating resistant part in this removable member, conducting means in this removable member adapted to contact with said feeding means when said two members 20 are engaged with each other, these conducting means being connected with the ends of said resistant part, means controlling the circuit in which said resistant part is inserted and means holding said controlling 25 means in open-circuit position when the device is out of service.

3. An electric lighter for cigars and the like, comprising a stationary member, feeding means in said member connected with the terminals of a current source, a removable member adapted to be engaged with 30 and separated from said stationary member, a heating resistant part in this removable member, conducting means in this removable member adapted to contact with said feeding means when said two members are engaged with each other, these conducting means being in circuit with said resistant part and a knob-controlled spring holding 35 said circuit open when the device is out of service.

4. An electric lighter for cigars and the like, comprising a stationary socket, a plug removably fitting in said socket, said plug having an outer recess, a heating resistant part in said recess, feeding parts in said socket each connected with a pole of a source of electric current, parts in said plug adapted to contact with said feeding parts 45 and connected with the ends of said resistant part and a spring switch holding normally open the circuit of said resistant part.

5. An electric lighter for cigars and the like, comprising a stationary socket, a plug removably fitting in said socket, feeding parts in said socket each connected with a pole of a source of electric current, said plug consisting of two parts insulated from 55 each other one of which has an outer recess, a heating resistant part located in said recess, a conducting member carried by the other part of said plug, a knob controlled movable part mounted to move in said con-

nected with one end of said resistant part and adapted to be contacted by said movable part, a spring holding these parts removed from each other, said resistant part having its other end connected with the part 70 of the plug enclosing it and one of the feeding parts of the socket leading to said conducting member and the other one leading to the part of the plug connected with said resistant part.

6. An electric lighter for cigars and the like, comprising a stationary socket, a plug removably fitting in said socket, feeding parts in said socket each connected with a pole of a source of electric current, said 80 plug consisting of two parts insulated from each other one of which has an outer recess, a heating resistant part located in said recess, a conducting member carried by the other part of said plug, a knob controlled 85 movable part mounted to move in said conducting member, a stationary part connected with one end of said resistant part and adapted to be contacted by said movable part, a spring holding these parts removed from each other, said resistant part having its other end connected with the part of the plug enclosing it and one of the feeding parts of the socket leading to said 90 conducting member and the other one leading to the part of the plug connected with said resistant part, and means for preventing said contacting parts of the plug from short-circuiting the source of current when the plug is being removed from said socket. 95

7. An electric lighter for cigars and the like, comprising a stationary socket, a plug removably fitting in said socket, feeding parts in said socket each connected with a pole of a source of electric current, said plug 100 consisting of two parts insulated from each other one of which has an outer recess, a heating resistant part located in said recess, a conducting member carried by the other part of said plug, a knob controlled 105 movable part mounted to move in said conducting member, a stationary part connected with one end of said resistant part and adapted to be contacted by said movable part, a spring holding these parts removed from each other, said resistant part having its other end connected with the part of the plug enclosing it and one of the feeding parts of the socket leading to said 110 conducting member and the other one leading to the part of the plug connected with said resistant part, said feeding parts of the socket and cooperating parts of the plug being so shaped and positioned as to prevent the part of the plug entering said 115 socket from short-circuiting the source of electric current when the plug is being removed from said socket.

8. An electric lighter for cigars and the like, comprising a stationary socket,

ing means in said member connected with the terminals of a current source, a removable member adapted to be engaged with and separated from said stationary member,
5 a heating resistant member comprising a flat resistant metal strip wound together with an insulating refractory ribbon, this resistant part being located in said removable member, conducting means in this re-

movable member adapted to contact with 10
said feeding means when said two members
are engaged with each other, these conduct-
ing means being connected with the ends of
said resistant part, and means controlling
the circuit in which is inserted said resist- 15
ant part.

Signed at Turin, Italy, this 22 Mar. 1921.
ALFREDO ZECCHINI.

June 2, 1925.

1,540,628

F. E. HURXTHAL ET AL

AUTOMATIC TEMPERATURE CONTROL FOR BREAD TOASTERS

Filed Dec. 1, 1924

2 Sheets-Sheet 1

Fig. 1.

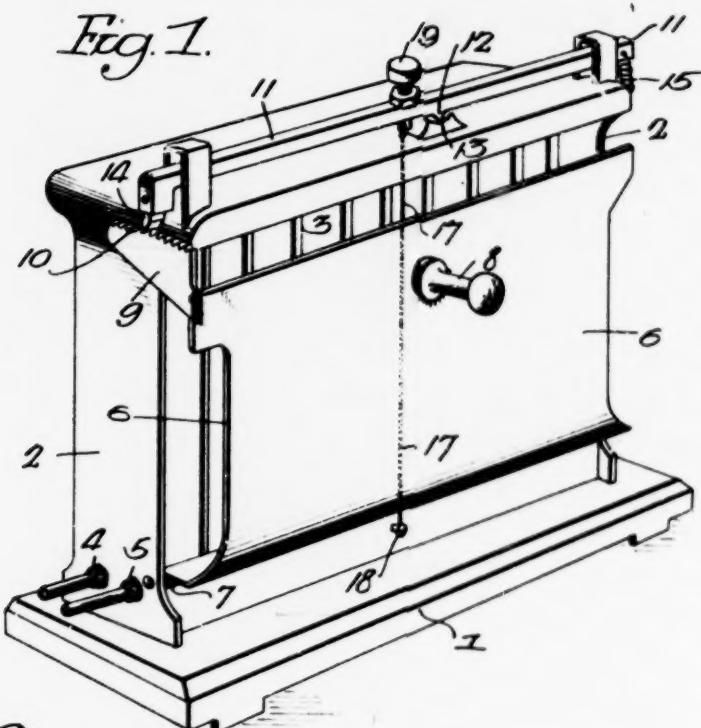


Fig. 2.

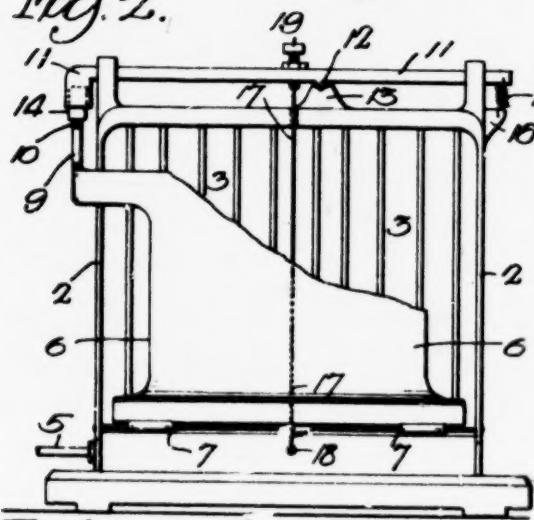


Fig. 3.

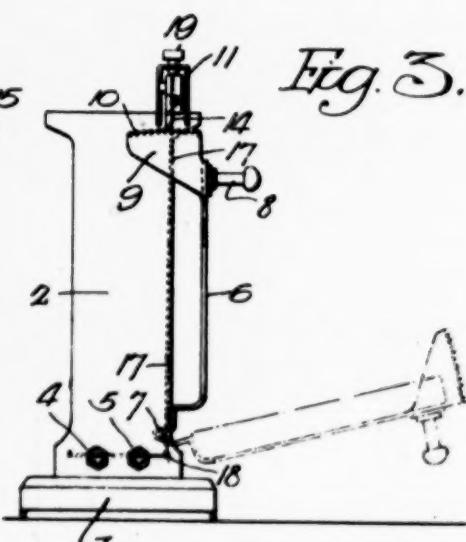
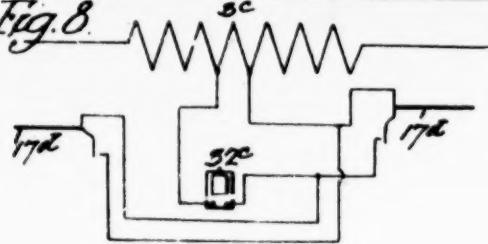


Fig. 4.



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June 2, 1925

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AUTOMATIC TEMPERATURE CONTROL FOR BREAD TOASTERS

Filed Dec. 1, 1924

2 Sheets-Sheet 2

Fig. 4.

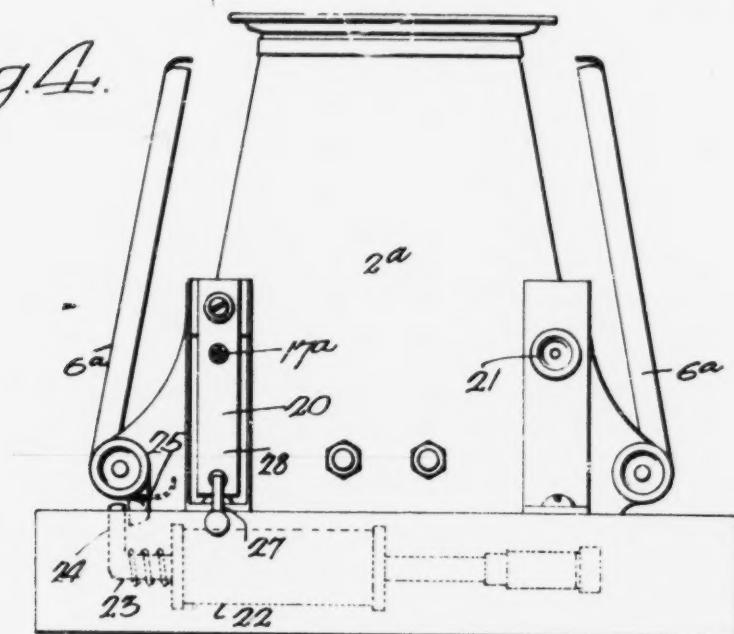


Fig. 5.

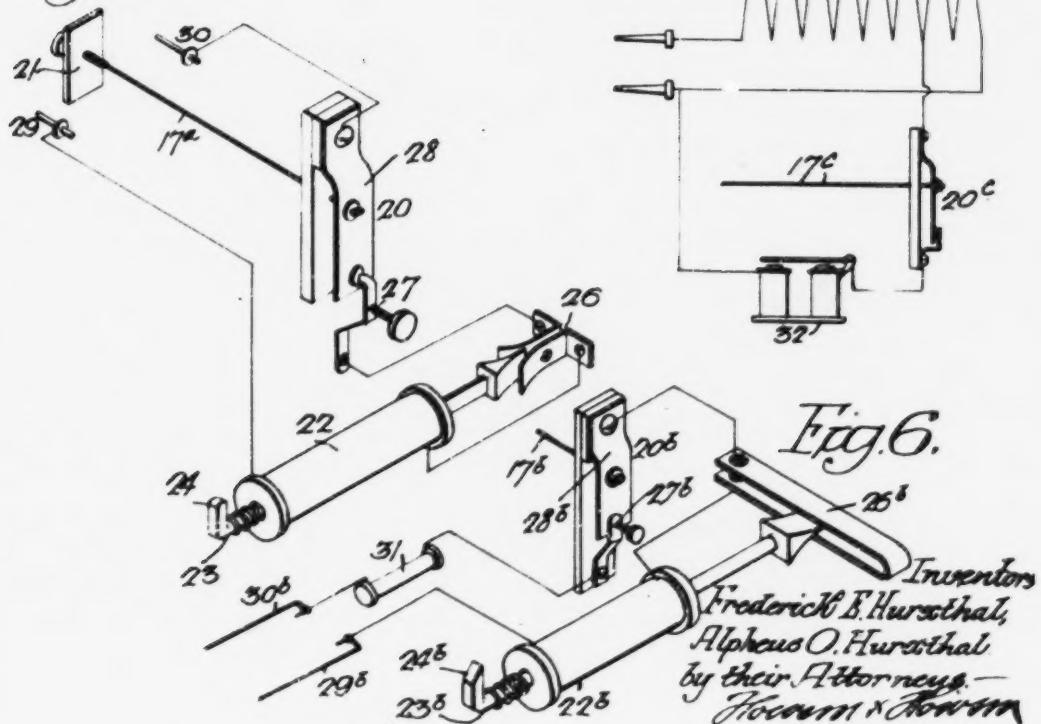


Fig. 7.

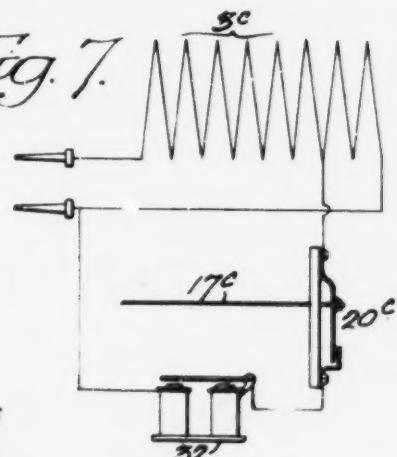


Fig. 6.

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Patented June 2, 1925.

1,540,628

UNITED STATES PATENT OFFICE.

FREDERICK E. HURXTHAL, OF SALEM, OHIO, AND ALPHEUS O. HURXTHAL, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC TEMPERATURE CONTROL FOR BREAD TOASTERS.

Application filed December 1, 1924. Serial No. 753,155.

To all whom it may concern:

Be it known that we, FREDERICK E. HURXTHAL and ALPHEUS O. HURXTHAL, residing, respectively, in Salem, Columbiana County, Ohio, and Philadelphia, Philadelphia County, Pennsylvania, have invented certain Improvements in Automatic Temperature Control for Bread Toasters, of which the following is a specification.

The object of this invention is to provide means, such as a sensitive element, for indicating automatically that an edible, such as bread, has been toasted, or seared, to a desired degree, said indicating mechanism being either means for separating the edible from the heating element or the operation of an audible or visible signal. It is also possible to break the electric circuit leading to the toaster.

In the present instance, the invention is shown in connection with an electric toaster of a known type, but it will be understood that it can be applied to a toaster used in connection with any heating device.

In the accompanying drawings:

Fig. 1 is a perspective view of an electric bread toaster embodying our invention;

Fig. 2 is a side view, partly broken away;

Fig. 3 is an end view;

Fig. 4 is a view illustrating a toaster provided with electric release mechanism for the toast carrier;

Fig. 5 is a diagrammatic view showing the electric circuit of the device illustrated in Fig. 4;

Fig. 6 is a diagrammatic view illustrating an electric circuit breaker for the main circuit of the heating element of the toaster;

Fig. 7 is a diagrammatic view illustrating an auxiliary circuit, the opening and closing of which operates an audible, or visible, signal; and

Fig. 8 is a diagrammatic view showing a signaling circuit, which is controlled by sensitive elements on each side of a double toaster.

Referring to Figs. 1, 2 and 3 of the drawings, these illustrate an electric toaster having a mechanical means for releasing the bread carrier, actuated by a sensitive element. The base 1 of the electric toaster supports a frame 2. This frame is provided with the ordinary electric heating element 3. The wires supplying the electric current are attached to terminals 4 and 5.

A bread carrier 6 is pivoted, in the present instance, at 7, to the frame 2. The carrier has a hand hold 8. When the carrier 6 is raised, a slice of bread is held parallel with the heating element 3. On one end of the carrier is an arm 9. This arm has a series of ratchet teeth 10. A bar 11 extends across the toaster and has a knife edge point 12 that rests in a V-bearing 13 on the top of the frame.

On one end of the bar is a pawl 14, which is arranged to engage one of the teeth 10 of the arm 9 of the bread carrier. Attached to the other end of the bar is a spring 15, which is connected to a bracket 16 on the frame.

17 designates a wire forming the expansion element. This wire is attached at 18 to the lower portion of the frame 2 and extends through an opening in the upper portion of the frame. It is attached to an adjusting screw 19, which is threaded into the bar 11. On the screw is a jamb nut.

We have discovered that the temperature of a slice of bread, when it is toasted correctly, is fairly definite. The surface of the untoasted bread is comparatively cool, and the wire, or other expansive element 17, assumes the temperature of the bread against, or near, which it is placed. The temperature of the expansion element increases in proportion to the increase in temperature of the surface of the bread. When the surface of the bread has reached a certain degree of heat, and has become toasted, the element 17 has expanded to such an extent as to allow the spring 15 to raise the pawl 14 on the bar 11, clear of the teeth 10 of the bread carrier, allowing the carrier to turn on its pivot and to fall away from the heating elements 3, as shown by dotted lines in Fig. 3.

The bread, one side of which has been toasted to the proper degree, is turned and the carrier is again raised. In the meantime, the wire—or other expansion element—has contracted sufficiently to allow the pawl 14 on the bar 11 to re-engage the teeth of the carrier when raised. The carrier is held until the other surface of the bread is toasted and then it is released again.

By turning the screw 19, the mechanism may be adjusted to allow the bread to remain for different periods so that the surfaces of the bread can be toasted to any degree desired.

While one form of bread toaster to which

the invention is applied has been described, it will be understood that the invention can be applied to other forms of toasters. Although only one expansion wire is shown, there may be two or more wires, if desired. Other expansion, or variable, elements, or materials, of varying electrical conductivity may be used. These elements should be arranged so that they will be close to, or against, the surface of the bread to be toasted.

The mechanism for maintaining the carrier in the toasting position may be a mechanical latch, such as illustrated in Figs. 1, 15 2 and 3, or an electrical element, such as a solenoid. In fact, any device, which can be operated by a sensitive element to release the carrier, or to move the electric heating elements away from the carrier, or to make 20 an audible or visible signal, or to cut out the electric current leading to the toaster, may be employed.

In Figs. 4 and 5, a toaster is illustrated, in which the sensitive wire 17^a is arranged horizontally and is attached to a circuit maker 20 at one side of the toaster frame 2^a, and is also attached to adjusting means 21 at the opposite side thereof. A solenoid magnet 22 is so located that its core 23, which 30 has a head 24, is arranged to engage an arm 25 on the bread carrier 6^a, when the core is drawn into the magnet. One end of the solenoid magnet 22 is connected to a wire 29 that leads to the heating element. The opposite end of the solenoid magnet is connected to one arm of a circuit breaker 26. The other arm of the circuit breaker is connected to the terminal 27 of the circuit maker 20 to which the sensitive wire 17^a is attached. The contact arm 28 of the circuit maker is connected to the other main wire 30, leading to the heating element.

In Fig. 6 is shown, in diagram, an arrangement by which the circuit leading to the heating element is interrupted when the bread has been toasted to the degree desired, so as to discontinue the toasting.

The core 23^b of the solenoid magnet 22^b has a cam 24^b, which is arranged to actuate 50 a switch, or other cut-out device, in the circuit leading to the heating elements. One end of the magnet 22^b is connected to a main wire 29^b and the other end of the magnet is connected to one arm of a circuit breaker 26^b. The other arm of the circuit breaker is connected to the arm 28^b of the circuit maker 20^b, while the terminal 27^b is connected to the main wire 30^b. A resistance coil may be placed in the circuit, as at 31, if desired.

The cam may not only actuate a switch, or other device, to break the circuit leading to the electric heating element, but may also trip the bread carrier, if desired.

In Fig. 7 an arrangement is shown, in

which a buzzer, or electric bulb, 32 is in a circuit tapped off of the heating element 3^c. The circuit maker 20^c, which is controlled by the sensitive element 17^c is in the circuit. When the wire, or other element, elongates, the circuit maker closes the circuit and the buzzer gives an audible signal. A bulb may be substituted for the buzzer, if desired, which is illuminated when the circuit is closed to give a visible signal that the bread has been toasted to the degree desired.

In Fig. 8 is shown, in diagram, one arrangement of providing a signal controlled by a sensitive element 17^d on each side of a double toaster and connected through an auxiliary circuit from the heating element 3^d with a signal, such as a buzzer, 32^d, or an electric light.

In the claims, the word "indicating" is used in the broad sense to include separating the bread, or other material, and the heating element, operating the circuit of the heating element, or giving an audible, or visible, signal.

While the toasting of bread has been described, it will be understood that the invention can be used for toasting, or searing, other material without departing from the main features of the invention.

We claim:

1. In a toasting device, a sensitive element located in such relation to the surface of the material to be toasted that it will be affected by the surface temperature of the material, and mechanism, actuated by the sensitive element, for indicating when the material is toasted.

2. The combination in a toaster of a heating element; a carrier for the material to be toasted; and automatic means for stopping the toasting of the material when the surface of the material being toasted has reached a given degree.

3. In a toasting device, a sensitive element located in such relation to the surface of the bread to be toasted that it will be affected by the surface temperature of the bread and will stop the toasting of the bread when a given temperature is reached.

4. The combination in a toaster, of a frame having a heating element; a bread carrier arranged to hold the bread in position to be toasted by said element and means for automatically separating the bread and the heating element when the surface of the bread being toasted has reached a given temperature.

5. The combination in a toaster, of a frame; an electric heating element thereon; a bread carrier arranged to be located in close proximity to the heating element; means for retaining the bread carrier in toasting position; and an expansion element controlling said means, said element being in such position, in respect to the surface of

the bread, as to be affected by the surface temperature of the bread.

6. The combination in a toaster, of a frame; an electric heating element thereon; a bread carrier pivoted to the frame; a bar arranged to hold the frame in front of the electric heating element; and a wire attached to the frame and to the bar, said wire being located between the heating element and the bread carrier and arranged in such position, in respect to the surface of the bread, as to be affected by the surface temperature of the bread.

7. The combination in a toaster, of a

frame; an electric heating element thereon; a bread carrier pivoted to the frame; a toothed arm on the carrier; a bar pivotally mounted on the frame; a pawl on the bar arranged to engage the toothed arm of the carrier; a spring for withdrawing the pawl; and a wire attached to the frame and to the bar and extending between the electric heating element and the bread and arranged in such position, in respect to the surface of the bread, as to be affected by the surface temperature of the bread.

FREDERICK E. HURXTHAL.
ALPHEUS O. HURXTHAL.

DISCLAIMER

1,540,628.—*Frederick E. Hurxthal; Salem, Ohio, and Alpheus O. Hurxthal, Philadelphia, Pa.* AUTOMATIC TEMPERATURE CONTROL FOR BREAD TOASTERS. Patent dated June 2, 1925. Disclaimer filed January 9, 1932, by the assignee, *Proctor & Schwartz Electric Company*.

Therefore disclaims from the specification the paragraph appearing at lines 84 to 89 of page 2 of the specification, which reads as follows:

"In the claims, the word 'indicating' is used in the broad sense to include separating the bread, or other material, and the heating element, operating the circuit of the heating element, or giving an audible, or visible signal."

Your petitioner also disclaims from the scope of claim 1 all devices except those in which the indicating means, referred to in said claim, is for indicating visibly or audibly.

[Official Gazette February 9, 1932.]

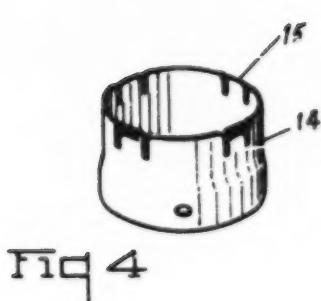
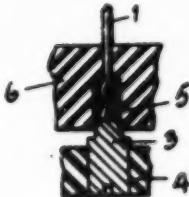
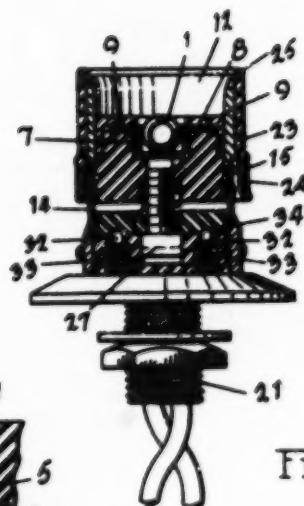
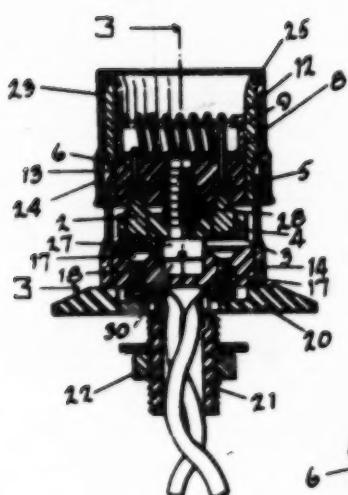
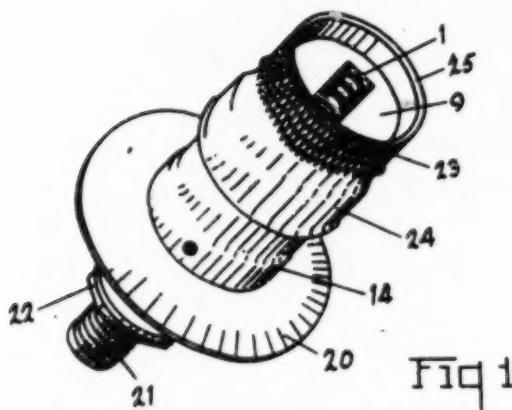
March 29, 1927.

1,622,334

B. L. METZGER

AUTOMOBILE CIGAR AND CIGARETTE LIGHTER

Filed Nov. 30, 1925



Inventor
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Franck G. Compton.
Attorney

Patented Mar. 29, 1927.

1,622,334

UNITED STATES PATENT OFFICE.

BENJAMIN L. METZGER, OF TOLEDO, OHIO.

AUTOMOBILE CIGAR AND CIGARETTE LIGHTER.

Application filed November 30, 1925. Serial No. 72,134.

My invention has for its object to provide an electric lighter for cigarettes and cigars, wherein a resistance element may be connected to a source of an electric current upon the operation of a removable member that encloses the resistance element, against a resilient means, that automatically operates to maintain the resistance element disconnected from said source, but which is supported in position for connection and yet may be readily removed from its support and used. The invention has for its objects other advantages and features which will appear from the following description and upon examination of the drawings.

The invention may be contained in cigar and cigarette lighters that differ in their details of construction. To illustrate a practical application of the invention I have selected a structure as an example of structures that contain the invention and shall describe it hereinafter. The structure selected for purposes of illustration is shown in the accompanying drawings.

Figure 1 of the drawings is a perspective view of the cigar and cigarette lighter referred to. Fig. 2 is a view of a section taken through the longitudinal axis of the cigar lighter. Fig. 3 is a view of a section taken on the plane of the line 3—3 indicated in Fig. 2. Fig. 4 is a view of a shell for supporting resistance element and yieldingly retaining the element in position for connection with the source of current. Fig. 5 is an enlarged view showing the manner in which the resistance element may be removably connected.

By my invention a resistance element 1 is connected to terminals 2 and 3 which are embedded in or contained within an insulating body but which may be uncovered in order to establish electric connection with a source of an electric current. The resistance element is so connected to its terminals that it may be readily separated from its terminals and the resistance element and the terminals are so supported that they may be removed from their position for connection with the source of current and used without having connected therewith the wires that are commonly used to connect resistance or heat coils directly to the source. The resistance element, which is preferably made in the form of the coil having a relatively large diameter to prevent undue clogging of the coil by the ashes

of cigars or cigarettes, is removably connected to the terminals 2 and 3. The terminals 2 and 3 have sockets 5 for receiving the ends of the wire that forms the resistance element 1. The ends of the wire may substantially fit the sockets 5 or the ends of the wire may be bent or clamped so as to be frictionally held in position within the terminals 2 and 3 as shown in Fig. 5. The terminals 2 and 3 are threaded into a block 6 of insulating material and the resistance element 1 is located in a recess 7 that is formed in the block. Asbestos 8 may be located between the resistance element 1 and the block to prevent direct contact between the resistance element and the block and also to form a means for preventing the transfer of heat from the resistance element. A sheet metal ferrule 9 may be used to cover the inner end of the block 6. The ends of the wire that form the resistance element 1 pass down through openings formed in the block and into the sockets 5 of the terminals 2 and 3. Thus the resistance element 1 may be removed from the lighter and replaced as may be desired. This is for purposes of repairs or replacement. The block 6 is located in the lower end of a sheet metal sleeve 12. The sleeve 12 is provided with a circular depression 13 near its lower end. A second sheet metal shell or sleeve 14 is fixedly secured in position for supporting the electric heating element and its terminals. The shell 14 is provided with a plurality of tongues 15 which are depressed within the circumference of the upper end of the shell 14 and form elastic means for engaging the lower end of the sleeve 12 and particularly in the circular depression 13. A cross section of the surface of the depression taken through the axis of the sleeve 12 is curved so that the tongues tend to maintain their ends at the bottom of the depression 13 so that when the sleeve 12 is pushed downwards the ends of the tongues will ride upon the upper portion of the surface of the depression 13 and when the shell 12 is released the tongues tend to return to the position such that the tongues will engage the bottom of the depression. The terminals 2 and 3 protrude from the block 6 and consequently contact may be established with the terminals when they are depressed against the resiliency of the tongues 15.

A pair of contacts 17 form terminals of

the electric wires that lead to a suitable source and are secured in position in a block 18 of insulating material. The contacts 17 may be formed of flat headed screws, the heads of the screws being counter-sunk to such a point that their upper surfaces are located slightly below the surface of the block 18. Thus when the sleeve 12 is rotated and while it is being depressed against the resiliency of the tongues 15 the terminals 2 and 3 will be brought to a stop by their entrance into the counter-sunk portions of the block 18. This will bring the terminals 2 and 3 in alinement with the contacts 17. The terminals 17 are located the same distance from the axis of the shell 14 that the terminals 2 and 3 are located from the axis of the sleeve 12 and consequently when the sleeve 12 is pressed downward against the resiliency of the tongues 15 and the terminals 2 and 3 are in alinement with the terminals 17, connection will be made between the source of supply of an electric current and the resistance element 1. The block 18 may be secured to a collar 20 or may be formed integral therewith. Also it may be secured to a sleeve 21 which may be inserted in the instrument board of an automobile and the lighter may be secured in position by means of the nut 22. The collar 20 and sleeve 21, whether made integral with the block 18 or otherwise, are preferably formed of insulating material. Also the sleeve 12 is preferably covered by a sleeve 23 of insulating material to prevent electrical contact with the current when the instrument is in use. The lower end of the sleeve 23 is preferably flared as at 24 in order to permit free movement of the upper end of the shell 14 except as such movement is resisted by the resiliency of the tongues 15. The sleeves 12 and 23 form a shell 25 for containing the resistance element.

In order to prevent the operator's hand from coming in contact with the terminals 2 and 3 which may be heated by conduction of the heat from the resistance element 1, the insulating head 4 covers or encloses the terminals. The insulating body 4 is preferably in the form of a disc in which the ends of the terminals 2 and 3 are located. The disc 4 is secured in position by means of the bolt 27 which is threaded into the block 6 and the spring 28 which is located in a socket 29. The disk 4 is normally held between the outer end of the spring 28 and the head of a bolt 27. A socket 30 is formed in the block 18 for receiving the lower end portion of the head of the bolt 27. This also aids in locating the shell 25 in coaxial relation with respect to the sleeve 14 and the block 18 and provides for the longitudinal, that is, the axial movement of the bolt 27 when the shell 25 is depressed. When the shell 25 is depressed the disc 4 is carried

down until it strikes the surface of the block 18. Upon further movement of the shell 25 the terminals project from the lower surface of the block 4 so that they can enter the counter-sunk portions of the block 18 and make contact with the contacts 17, that is, with the heads of the screws that form the terminals of the wires that are connected to the source of electric current, when the terminals 2 and 3 are in alinement with the contacts 17. In order that this position may be readily detected by the operator of the instrument, a pair of spring pressed pins 32 are located in the block 18 and so as to protrude from the upper surface of the blocks. Springs 33 are located in sockets formed in the block and between the collar 20 and the lower ends of the pins 32. The pins 32 are thus yieldingly pressed upwards. The disc 4 is provided with a pair of recesses or holes 34 for receiving the ends of the pins 32. The pins 32 and the holes 34 are located diametrically opposite and consequently within the limitations of a one half turn the pins will enter the holes 34 and thus the alinement of the terminals 2 and 3 with the contact 17 may be quickly determined.

In the operation of the lighter, the user depresses the shell 25 until the lower ends of the terminals 2 and 3 strike the upper surface of the block 18. The shell 25 is then rotated until the pins 32 enter the holes 34 when further rotation will be stopped and by the inward pressure which is maintained in order to push the shell 25 down against the action of the tongues 15 and the spring 28, the terminals 2 and 3 will make contact with the contacts 17. The shell 25 is held in this position until the resistance element 1 has become sufficiently heated to light a cigar or cigarette. The shell 25 may then be readily pulled from the shell 14 and the lighter placed against the end of a cigar or cigarette until it is lighted. The shell 25 may then be replaced on the end of the shell 14 where it will be resiliently held in position for connection by the electric heating element and the source of current.

I claim:

1. In a cigar and cigarette lighter, a shell, a pair of electric terminals located in the shell, a second shell telescopingly supported by the first named shell, the first named shell having a circular depression and the second named shell having tongues for maintaining the first named shell in position relative to the second named shell, a resistance element located in the second named shell and having terminals adapted to make contact with the electric terminals in the first named shell.

2. In a cigar and cigarette lighter, a shell, a pair of electric terminals located in the shell, a second shell telescopingly supported by the first named shell, a resistance element located in the second named shell and having

terminals adapted to make contact with the electric terminals in the first named shell, a disc resiliently supported on the end of the second named shell for enclosing the outer ends of the terminals of the second named shell, the said disc having recesses, a block supported in the first named shell and spring pressed pins protruding from the said block for engaging in the recesses of the said disc to place the terminals of the second named shell in alinement with the electric terminals of the first named shell.

3. In an electric cigar and cigarette lighter, a shell, a pair of electric terminals connected to a source of supply of an electric current and located in the shell, a second shell telescopingly and removably supported by the first named shell, a resistance element located in the second named shell and having contacts at its ends adapted to make contact with the electric terminals in the first named shell and an elastic means for normally maintaining the contacts separated from the terminals.

4. In an electric cigar and cigarette lighter, a shell, a pair of electric terminals connected to a source of electric current and located in the shell, a second shell, a resistance element located in the second named shell and having contacts at its ends adapted to make contact with the electric terminals in the first named shell, the first named shell having elastic means for resiliently holding the second named shell in axial alinement with the first named shell and means located on the second named shell for normally covering the contacts.

5. In an electric cigar and cigarette lighter, a shell, a pair of terminals connected to a source of supply of an electric current located in the shell, a second shell telescopingly supported by the first named shell, a resistance element located in the second named shell and having contacts connected to its ends adapted to make contact with the electric terminals in the first named shell, a spring pressed disc connected to the first named shell, the ends of the contacts of the second named shell being located within the said disc, the first named shell having means for uncovering the contacts when the second named shell is moved inwardly with respect to the first named shell.

6. In an electric cigar and cigarette lighter, a shell, a pair of electric terminals located in the shell, a second shell telescopingly and removably supported by the first named shell, a resistance element located in the second named shell and having contact connected to its ends and adapted to make contact with the electric terminals in the first named shell, a disc resiliently supported on the end of the second named shell for enclosing the outer ends of the contacts, a block supported in the first named shell and having recesses the ends of the terminals located in the bottom of the recesses.

7. In a cigar and cigarette lighter, a shell, a pair of electric terminals located in the shell, a second shell telescopingly supported by the first named shell, a resistance element located in the second named shell and having terminals adapted to make contact with the electric terminals in the first named shell, a disc resiliently supported on the end of the second named shell for enclosing the outer ends of the terminals of the second named shell, the said disc having recesses, a block supported in the first named shell and spring pressed pins protruding from the said block for engaging in the recesses of the said disc to place the terminals of the second named shell in alinement with the electric terminals of the first named shell and means for elastically holding a second named shell in position and the contacts away from the terminals.

8. In a cigar and cigarette lighter, a shell, a pair of electric terminals located in the shell, a second shell telescopingly supported by the first named shell, a resistance element located in the second named shell and having terminals adapted to make contact with the electric terminals in the first named shell, a disc resiliently supported on the end of the second named shell for enclosing the outer ends of the terminals of the second named shell, a block supported in the first named shell and having recesses, the outer ends of the terminals located in the bottom of the recesses and means for elastically holding the second named shell in position and the contacts away from the terminals.

In testimony whereof I have hereunto signed my name to this specification.

BENJAMIN L. METZGER.

Jan. 1, 1929.

1,697,686

A. F. LANGOS

CIGAR LIGHTER

Filed Feb. 24, 1927

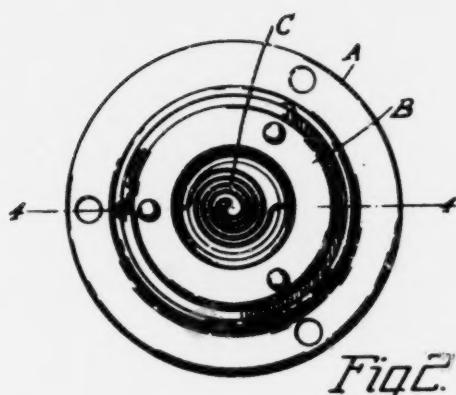


Fig. 2.

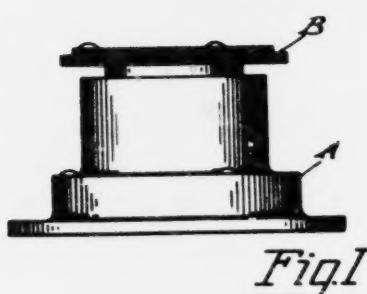


Fig. 1

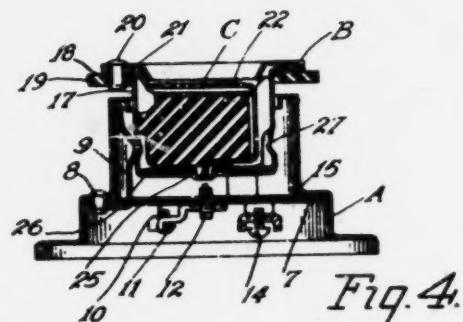


Fig. 4.

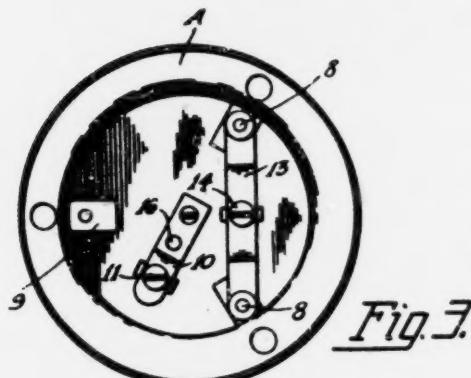


Fig. 3.

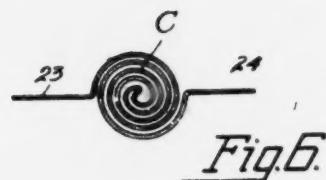


Fig. 6.

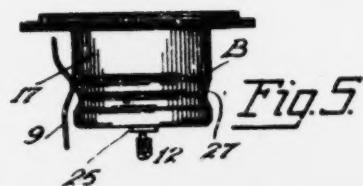


Fig. 5.

Inventor:
Alfred F. Langos
George E. Mueller
Atty.

Patented Jan. 1, 1929.

1,697,686

UNITED STATES PATENT OFFICE.

ALFRED F. LANGOS, OF CHICAGO, ILLINOIS.

CIGAR LIGHTER.

Application filed February 24, 1927. Serial No. 170,499.

My invention relates to cigar lighters and has to do more particularly with electrically heated cigar lighters of the character adapted for lighting cigars and cigarettes, although not limited to this particular use.

An object of my invention is to provide a so-called wireless cigar lighter, that is, one in which the lighting element is supported in a base of some kind and adapted to be heated while held in the base and then removed from the base for use, the base and lighting element being entirely independent when separated, that is, with no electrical or mechanical connection between the parts.

Another feature of my invention is the provision of such a device in which the lighting element is normally electrically disconnected from the heating circuit but may be manually manipulated to momentarily close the heating circuit, after which the device may be removed for use.

Another feature of my invention is the provision of an improved form of resistance or heating element in the form of a double spiral having freely extending ends by which the element may be supported. Other features and advantages of my invention will be more particularly pointed out in the ensuing portion of the specification and appended claims.

For a better understanding of my invention reference is to be had to the accompanying drawing, in which—

Fig. 1 is a side elevation of the assembled device;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 is a bottom view of Fig. 1;

Fig. 4 is a transverse sectional view along the line 4—4 of Fig. 2;

Fig. 5 is a view of the lighting element in its manipulated or separated position whereby its heating circuit is closed; and

Fig. 6 is a plan view of the resistance or heating element before being placed in the supporting plug.

Referring now more in detail to the invention as illustrated, I provide a suitable base or supporting member A in the form of a socket adapted to receive the heating element plug B which is adapted to be inserted in an opening in the top of the socket. The base A is constructed to support suitable current supply terminals to which the electrical conductors are to be secured, and in the present instance I provide an insulating support for the terminals in the form of a fibre disk 7 secured to the base A by three rivets 8, which

rivets also act to hold corresponding springs 9. As to the terminals, I provide one terminal plate 10 which is riveted to the fibre disk 7 and has a conductor clamping screw 11 threaded therein. This terminal plate 10 also has a central contact screw threaded into the plate 10 so as to provide adjustment, this screw having a suitable contact end preferably in the form of a platinum tip adapted for contact with the plug, as will be later described. A second terminal member 13 in the form of a metal plate is riveted to the base by the same rivets 8 that secure two of the springs 9, thus this plate 13 is electrically connected with these springs 9 and with the base A so that they all are in common electrical connection and may act as the so-called ground terminal of the device. That is, if the base A is secured directly to a grounded portion of the car, that is, for instance, the metal instrument plate, the springs 9 are thus adapted to carry this grounded connection to the plug and thus act as one conductor of the circuit, as will more clearly appear. This plate 13 has a central clamping screw 14 so that a conductor may be secured thereto if desired. A mica sheet 15 is interposed between the fibre disk 7 and the base A, thereby acting to insulate the end 16 of the rivet 16 by which the terminal plate 10 is fastened to the disk 7 so as to prevent accidental contact between this element and the plug.

Now as to lighting element B, this is in the form of a plug shaped device comprising a metal casing 17 having a flange 18 to which an insulating ring 19 is secured by which the device may be manipulated by the operator and thus avoid placing the hands in contact with any electrically charged element. This ring 19 is secured to the plug sleeve 17 by rivets 20 which also pass through an upper clamping plate 21. Within the plug casing 17 is a suitable resistance element supporting member in the form of a porcelain plug 22 cupped at its upper end to receive the resistance or lighting element C. This element C is preferably made up in a self-sustaining shape and to this end is formed up of a continuous wire resistance comprising two spirals, the turns of one being interposed between the turns of the other and connected together at their inner ends, the outer ends 23—24 extending freely to provide supporting or attaching means therefor. I preferably make this resistance element of wire sufficiently

thick to provide self support, that is, so that it will retain its shape although the cigar or cigarette may be pressed against it when being lighted.

In order to support this resistance element C I use the said freely extending ends thereof for this purpose and also to act as conductors to the element and therefore the end 23 is inserted between the plug shell 17 and the clamping plate 21. Thus the heating element is supported by the end and also in electrical contact with the sleeve 17 which acts as an electrical conductor to the device, as will presently appear. The free end 24 of the resistance element extends downwardly through a passage in the porcelain plug 22 and then to the center of the device where it is secured to a contact plate 25 carrying a platinum contact element for engagement with the cooperating contact 12 when the plug is depressed in the base socket. This brass plate 25 is held in the plug by having its outstanding ends interposed between the sheet of mica 26 which lies between the end 23 of the shell 17 and the porcelain plug 22. The shell 17 has an annular groove 27 which receives the bent-in portion of the retaining springs 9 so as to yieldingly or readily removably hold the plug in the socket. These elements 9-27 are so related that when the plug is inserted in the socket it is normally held in inoperative position, that is, with the electrical circuit therefor interrupted because of the non-engagement of contacts 12-25. In order to close this heating circuit the plug B is manipulated by pressing it inwardly into the socket against the tension of the springs 9 until the contacts 12-25 close to supply the electrical heating circuit for the plug. When the plug is so depressed the springs 9 are moved outwardly as indicated in Fig. 5 with the rounded portion engaging the groove 20 sufficiently so that when manual pressure upon the plug B is released these springs pressing inwardly will force the plug B back into its normal position to interrupt the heating circuit.

Referring now to the operation of the device and assuming that an electrical heating circuit has been connected to the base terminal plates 10-13, in order to heat the lighting element the operator grasps the insulating ring 19 of the plug and presses the plug inwardly against the tension of springs 9 until the contacts 12-25 are closed. In the ordinary device as I have used it on six volts, which is the usual voltage on an automobile, the lighting element C becomes sufficiently incandescent in about three seconds that the plug retains enough heat so that it may be passed around to light three or four cigarettes or cigars. Thus, assuming the plug has been depressed until the resistance element becomes incandescent as stated, the plug is then withdrawn entirely from the base

and is thus independent of any mechanical or electrical connection with the base and may be freely passed to the occupants of the car or wherever it is used. After being used the plug is replaced in the socket and is held by the springs 9 in such a position that the lighting circuit is normally interrupted. When the device is to be used again the plug is simply depressed until sufficiently heated and then withdrawn for use. 75

Although for the purpose of illustration I have shown a preferred form of my invention, I contemplate constructing it and using it in other ways than herein illustrated and described and therefore do not desire to be limited to the exact structure shown but aim to cover all that which comes within the spirit and scope of the appended claims. 80

What I claim as new and desire to secure by United States Letters Patent is:— 85

1. An electrically heated lighting element of the character described comprising a resistance element shaped in the form of two spirals the turns of one being interposed between the turns of the other and connected together at their inner ends with the outer ends freely extending for supporting the element and the spirals being all in substantially the same plane. 90

2. A wireless electrically heated cigar lighter including a current supply terminal carrying base and a cigar lighting element independent of any permanent wiring interconnection, means for readily removably holding the lighting element in the base so as to permit removal of the element for use, and means for momentarily connecting an operating circuit for the element to heat the latter before removal from the base for use, said holding means including a yielding holding spring mounted to serve as an electrical connection between the base and lighting element. 100

3. An electrically heated cigar lighter comprising a base in the form of a shell, an insulating disc across the shell and having a contact at the center thereof, a plurality of spring contacts secured to the base with a center portion bellied toward the center of the shell, a plug heating element adapted to be inserted in the base shell and comprising a plug shell with an annular groove which the bellied portion of the spring contacts engage, a center contact extending through a central opening in the plug shell, and a heating element having one terminal connected to the plug shell, and the other terminal connected to said center contact, the center contacts on the shell and insulating disc being normally separated, with the spring contacts engaging in said annular groove, but the plug being movable bodily inwardly in response to manual pressure temporarily to close the circuit and energize the element, the plug being removable entirely 110

from the base shell when the element is heated.

4. The cigar lighter defined in claim 3 wherein said plug shell has an insulating plug center with the lighting element spaced from the insulating plug center and supported by its terminals, one of said terminals being secured to the plug center and the other terminal extending through a passage 10 in said insulating center to engage said center contact.

5. The cigar lighter defined in claim 3 wherein said base shell is flanged to serve as a stop for said spring contacts, so that 15 ample tension may be had therein without permitting too great inward movement when the plug is removed such as would make reinsertion of the plug difficult.

6. The cigar lighter defined in claim 3 wherein said plug shell is flanged and has a heat insulating ring riveted thereto for grasping the plug with the fingers, the riveting of the ring serving to secure the heat element terminal in contact with said plug 25 shell.

7. An electrically heated cigar lighter including two principal members in the form of a base and a cigar lighting plug, said plug containing an electric heating element, re-

movable from the base when the element has 30 been heated, a center terminal on both the base and plug, resilient means normally holding said center terminals separated, and separate circularly disposed terminal means on one of the members with a cooperating 35 terminal on the other member adapted to form contact at any radial position of the plug so that said plug may be inserted into the base at any position and electrical contact established with the base through the terminal by simple inward pressure only of the 40 entire plug body.

8. In an electric cigar lighter a base having a socket with a central terminal and spring contacts at the side, at least one of 45 which is adapted to serve as a second terminal and a plug having an outer shell, a heating element with one lead connected to the shell and central terminal connected to the other element lead, said spring contacts 50 normally holding the two center terminals separated and bodily inward movement only of the plug serving to bring said terminals together.

In witness whereof, I hereunto subscribe 55 my name this 8th day of February, 1927.

ALFRED F. LANGOS.

Oct. 22, 1929.

S. L. WOLFSON ET AL

1,732,784

CIGAR LIGHTER

Filed Oct. 8, 1928

Fig. 1.

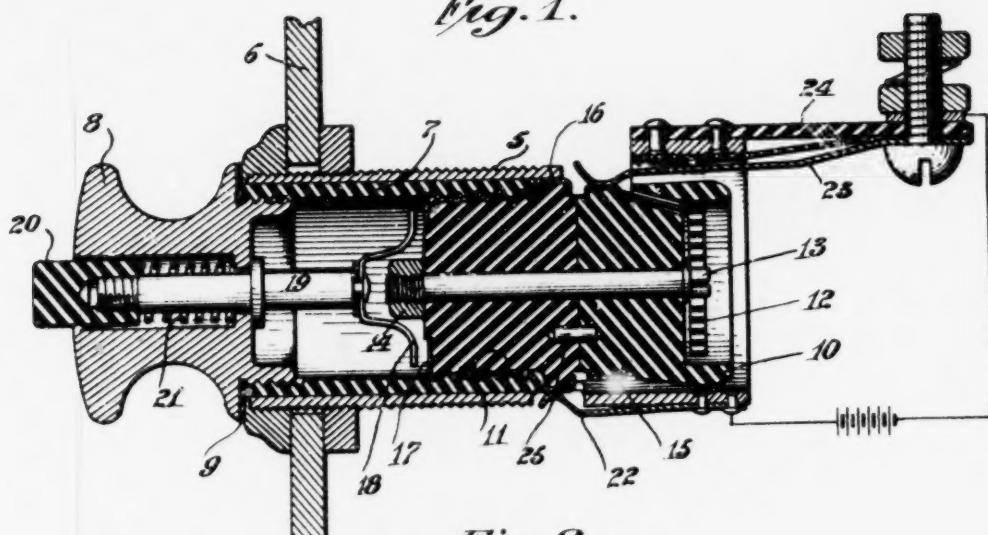


Fig. 2.

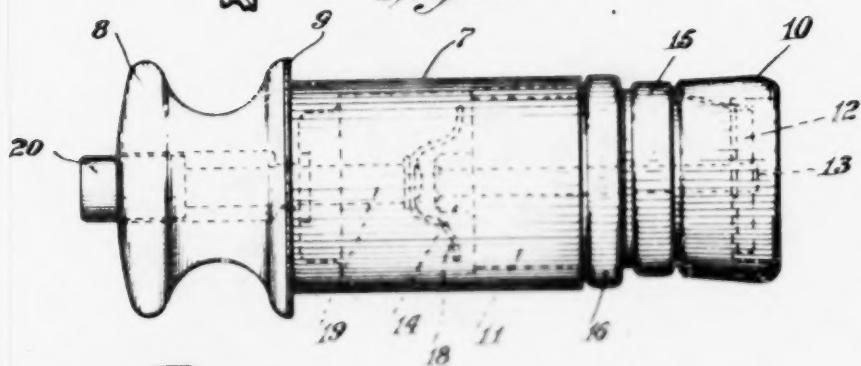
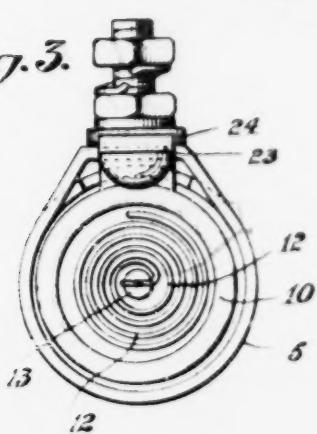


Fig. 3.



Sidney L. Wolfson
Charles C. Schreyer
INVENTORS
BY
H. J. Flynn
ATTORNEY

Patented Oct. 22, 1929

1,732,784

UNITED STATES PATENT OFFICE

SIDNEY L. WOLFSON, OF MERIDEN, CONNECTICUT, AND CHARLES C. SCHOEN, OF DETROIT, MICHIGAN, ASSIGNORS TO THE CUNO ENGINEERING CORPORATION, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT

CIGAR LIGHTER

Application filed October 8, 1928. Serial No. 310,955.

This invention relates to the so-called wireless type of lighter which has stationary current supplying terminals and a removable or separately portable lighter unit.

One object is to provide a simple and yet efficient, durable and attractive form of device suitable for installation in automobiles.

In its preferred form the device includes a stationary tubular holder provided with suitable circuit terminals and contacts, which holder is adapted to be secured to an instrument board or other support, and a removable lighter unit having a projecting knob and adapted to be inserted into the holder and provided with a push button switch member. This lighter unit has in turn a readily replaceable heater unit including a resistance coil.

Fig. 1 is a longitudinal sectional view showing one form of the device on a somewhat enlarged scale, the switch being shown in the open circuit position.

Fig. 2 is a side view of the lighter unit removed from the holder.

Fig. 3 is a rear end view of the holder and lighter unit.

The tubular member 5 is preferably of metal and may be secured in any suitable manner to a support 6 which may be the instrument board.

The removable lighter unit includes a tubular sleeve 7 preferably formed of insulating material. The knob 8 may be conveniently screw threaded into the outer end of the tube 7. If this knob is of metal an insulating washer 9 may be interposed at the rear of the knob to prevent grounding.

The heater unit has a body of insulating material which may conveniently be formed of the parts 10 and 11, for instance of lava-ite or other heat resisting material to prevent transfer of heat to the other parts of the device. The incandescent member 12 is preferably in the form of a coil of resistance metal having its inner end connected to the central screw or tie rod 13. The nut 14 on the inner end of the screw 13 serves to hold the parts together and also serves as a contact. The outer body part 10 is provided with a contact ring 15 which is crimped or

spun in place and electrically engages the outer end of the coil 12. This body part 10 preferably has a flange which surrounds the coil 12 and serves to restrict radiation from the coil. This not only protects the surrounding parts when the lighter unit is in the holder but also prevents the coil from cooling off too soon when the lighter unit is being used.

The other body part 11 is provided with a sleeve 16 which may be provided with a screw thread so that it can be screwed into the end of the tube 7. A flange of this sleeve 16 at the end of the body member 11 serves as a contact of the switch whose movable spring member 18 is adapted to bridge from the contact nut 14 to the flange 17.

This movable switch member 18 is carried by a plunger 19 which is supported in the knob 8 and provided with a push button 20 and a spring 21 for holding the switch member normally in open circuit position.

The tubular holder 5 serves as one terminal of an electric circuit and may be grounded in any suitable manner. The sleeve 16 may contact with this tube 5 as shown at the upper part of Fig. 1 but I prefer to provide in addition a spring contact finger 22 to ensure a perfect contact from the tube 5 to the sleeve 16 and its flange 17. The other side of the circuit is suitably connected to a spring contact finger 23 supported by an insulating bar 24 at the rear of the tubular holder. The front end of this spring 23 engages the contact ring 15 when the parts are in the position shown in Fig. 1. A dowel pin 25 or other interlocking member may be provided to prevent relative rotation between the body parts 10 and 11.

Normally the parts are in the position shown in Fig. 1 which is the open circuit condition. To heat the incandescent resistance member 12 it is simply necessary to push in on the button 20 until the spring 18 connects the flange 17 to the nut 14. The circuit may then be traced from the battery or other power source to the tube 5, spring 22, sleeve 16, flange 17, switch member 18, nut 14, screw 13, heater coil 12, flanged ring 15, spring finger 23 and back to the power source.

As soon as the coil has reached the proper degree of incandescence the lighter unit may be pulled out and used. Obviously, it will not be necessary to continue to press on the button 20 and yet when the pressure on the button is removed the spring 21 automatically moves the switch member 18 away from the heater contacts so that when the unit is again inserted into the holder 5 the circuit is not closed although the contact fingers 22 and 23 are automatically engaged respectively by the sleeve 16 and ring 15.

In case the coil 12 should be burned out or the body member 10 broken the heater unit may be readily removed by simply unscrewing it from the tube 7 and replacing it with a new unit.

It will be noted that the plug or insertable and removable lighter member is made largely of material which does not conduct electricity and is a poor conductor of heat and that the manually operated parts are not in the electrical circuit.

We have endeavored to confine, as much as possible, the heat generated to the operative portion of the lighter making it more efficient and practical in use.

The parts are so constructed that the lighter unit is held in place frictionally without catches or other parts which might get out of order or retard its free insertion or removal.

It will also be noted that the lighter unit may be inserted in any rotative position relative to the holder. Although we have shown the device as mounted horizontally, it is obvious that it might be mounted vertically or at an angle. On account of the shape and arrangement of the knob and push button it is possible to arrange the device so that it is practically invisible or in some out of the way place and the device can be operated without looking at it. The only parts which are normally visible when the device is not in use are the knob and push button which may be made ornamental and of a design to harmonize with the instrument board fittings, etc.

We claim:

1. A cigar lighter including a tubular holder having spring contacts near one end, a removable lighter unit insertible into said holder, and including an insulating sleeve having a knob at its outer end, and a heater unit detachably secured in the inner end, said heater unit including a heat resisting body having a coil at one end and a switch contact at the other end, a ring contact carried by the body and connected to the outer end of the coil and adapted to engage one of said spring contacts, a shell carried by said body and adapted to engage the other spring contact, a center contact at the inner end of said body connected to the center of said coil and a spring pressed push button

in said knob having a movable switch member at its inner end adapted to connect said shell and said center contact.

2. A cigar lighter including a tubular holder in an instrument board and having contacts behind the board, a removable lighter unit insertible into the front end of said holder and including an insulating sleeve having a knob at its outer end, and a heater unit detachably secured in the inner end, said heater unit including a heat resisting body having a recess with a coil at one end and a switch contact screw extending to the other end, a ring contact carried by the body and connected to the outer end of the coil and adapted to engage one of said contacts, and means including a spring pressed push button in said knob having a movable switch member at its inner end adapted to complete the circuit to said center contact.

3. A removable unit for a cigar lighter comprising, a sleeve having a knob containing a push button at one end, and a removable heater unit secured in the other end, said heater unit having an insulating body with a resistance element at its outer end and a contact ring fast on the body and connected to one end of the resistance element, a center contact at the opposite end of the body connected to the other end of the resistance element and a contact shell on the body having a peripheral contact ring and an end flange, said push button having a movable switch member adapted to connect the center contact and said flange.

4. A cigar lighter including an insulating sleeve, a knob secured to the outer end thereof, a push button switch member in said sleeve and a detachable igniter unit having a screw threaded connection with the other end of said sleeve, said unit including an insulating body, a resistance element secured to the rear end of said body, two circuit terminals carried by said body, one of said terminals being connected to one end of the resistance element, a switch contact connected to the other end of said element and a switch contact connected to the other terminal.

5. A replaceable heater unit for cigar lighters comprising two insulating bodies, a central tie rod having a contact at the rear end and a resistance coil in a recess at the other end and having one end secured to the opposite end of said rod, a flanged contact ring secured on one body and connected to the other end of the coil, and a screw shell secured on the other body and having a contact ring at one end and a contact flange at the other end.

6. A cigar lighter comprising a tubular housing open at the front, means for supporting said housing at its front end, two spaced-apart, stationary contacts carried by the rear

end of the housing one contact being arranged with its action surface in front of the other, a lighter member adapted to be inserted into said housing from the front and consisting of a tubular body, a knob secured to the front end of the body, an insulating base carried by the rear of the body, a heater wire mounted in the rear of said base, two contact rings carried by said base, spaced apart from each other and adapted to engage respectively the stationary contacts of the housing when the lighter member is inserted in the housing, a double-break spring-pressed switch member mounted in the tubular body and having a push button extending through the knob, one of said rings being connected to one end of said heater wire and switch contacts connected respectively to the other end of the heater wire and to the other ring, and adapted to be bridged by said switch member when said push button is operated.

7. A cigar lighter comprising a tubular housing open at both ends, means for supporting said housing at its front end, two spaced-apart spring contacts carried by the rear end of the housing, a lighter member adapted to be inserted into said housing from the front and consisting of a tubular body, a knob secured to the front end of the body, an insulating base carried by the rear of the body, a heater wire mounted in the rear of said base, two contacts carried by said base, spaced apart from each other longitudinally of the base, the rear base contact being of smaller diameter than the other base contact and adapted to engage respectively the spring contacts of the housing when the lighter member is inserted in the housing, a resilient switch plunger member mounted in the tubular body and having a push button extending through the knob, one of said base contacts being connected to one end of said heater wire and switch contacts connected respectively to the other end of the heater wire and to the other base contact and adapted to be bridged by said resilient switch member when said push button is operated.

8. A cigar lighter comprising a tubular metal housing open at the front, means for supporting said housing at its front end, two spaced-apart spring contacts carried by the rear end of the housing one of said contacts being insulated from the housing, a lighter member adapted to be inserted into and removed from said housing from the front and consisting of a tubular insulating body, a knob secured to the front end of the body, a heat resisting insulating base carried by the rear of the body, a heater wire carried by said base, two contact rings carried by said base, spaced apart from each other one in front of the other and adapted to engage respectively the spring contacts of the housing when the lighter member is inserted in the housing, the insulating base being of larger diameter

than the rear ring, one of the said rings being connected to one end of said heater wire and means for connecting the other end of the heater wire to the other ring.

9. A cigar lighter comprising a stationary tubular housing open at the front, means for supporting said housing near its front end, two spaced-apart spring contacts carried at opposite sides of the rear end of the housing and pressing inwardly toward each other, a lighter member adapted to be inserted into and removed from said housing from the front between said contacts and consisting of a body, a knob secured to the front end of the body, a heat-resisting insulating base carried by the rear of the body, a high-resistance heater wire secured to the rear of said base, two contacts carried by said base spaced apart from each other and adapted to engage respectively the spring contacts of the housing when the lighter member is inserted in the housing, one of said base contacts being connected to one end of said heater wire, and means for connecting the other end of the heater wire to the other base contact.

10. A cigar lighter comprising a tubular housing open at the front, means for supporting said housing near its open end, two spaced-apart spring contacts carried by the rear end of the housing, a lighter member adapted to be inserted into and removed from said housing from the front and rotatable therein and consisting of an insulating body, a knob secured to the front end of the body, a heat resisting base carried by the rear of the body, a heater wire carried by said base, two contact rings carried by said base, spaced apart from each other with a groove between them and adapted to engage respectively the spring contacts of the housing when the lighter member is inserted in the housing, the base being of larger diameter than the rear ring, one of said rings being connected to one end of said heater wire and a spring pressed switch member for connecting the other end of the heater wire to the other ring.

11. A cigar lighter comprising a tubular housing open at both ends, means for supporting said housing, two spaced-apart contacts carried by said housing, a lighter member adapted to be readily inserted into and removed from said housing from the front and consisting of an insulating body, a knob secured to the front end of the body, an insulating base carried by the rear of the body, a heater wire carried by the rear of said base, two contacts carried by said base, spaced apart from each other and adapted to engage respectively the spring contacts of the housing when the lighter member is inserted in the housing, a spring pressed switch plunger member mounted in said body and having a push button extending through the knob, one of said base contacts being con-

nected to one end of said heater wire and
switch contacts connected respectively to the
other end of the heater wire and to the other
base contact and adapted to be bridged by
said switch member when said push button
is operated.

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CHARLES C. SCHOEN.**

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May 6, 1930.

C. B. MAHAN

1,757,255

ELECTRIC CIGAR LIGHTER

Filed June 6, 1929

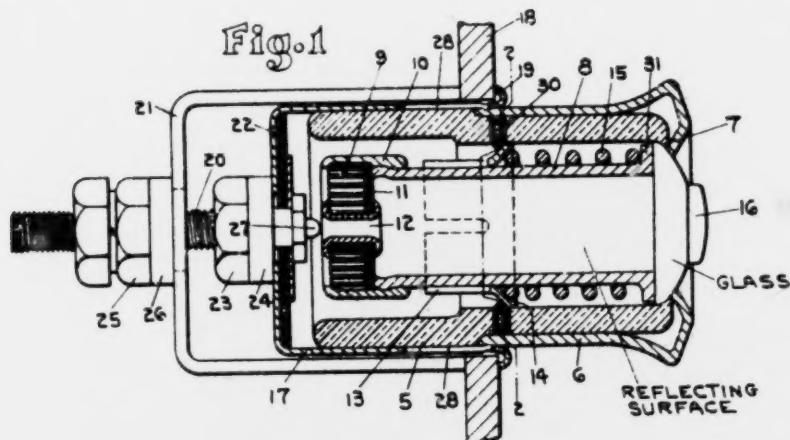


Fig. 2

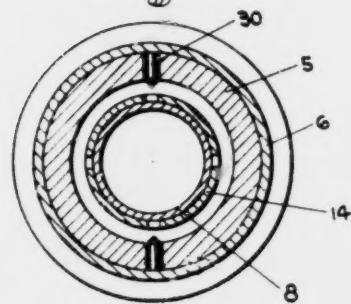
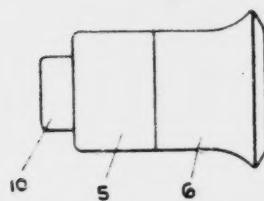


Fig. 3



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 by his attorney
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Patented May 6, 1930

1,757,255

UNITED STATES PATENT OFFICE

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ELECTRIC CIGAR LIGHTER

Application filed June 6, 1929. Serial No. 368,894.

This invention relates to an electric lighter, or igniting device, such as is used by smokers, and particularly to a lighter of the so called "wireless" type. Lighters of this type are commonly used in motor vehicles, and comprise a stationary member, or support, and a removable member provided with a resistance wire or heating element, and normally supported by the stationary member, but removable therefrom, for use, after the heating element has been heated by electric current.

One object of the present invention is to produce a lighter, of the type in question, which is so constructed that it may be used conveniently for lighting a pipe, as well as a cigar or a cigarette. To this end, the invention comprises a heating element which is normally surrounded and guarded by a part of the removable member, but which may be caused to protrude therefrom for use in lighting a pipe.

Another object of the invention is to provide simple and convenient means for closing the circuit through which the heating element is energized, such means being so arranged that they are not liable to accidental operation, and that accidental contact of the person with the heating element is impossible during the heating operation. To this end, the invention comprises an arrangement in which the heating element is located at the rear end of the removable member, and is supported by a plunger which is slidable within the body of the removable member, to permit the necessary engagement of the contacts without movement of the entire removable member.

Other objects of the invention, and the features of construction by which they are attained, will be set forth hereinafter, in connection with the description of the illustrated embodiment of the invention.

In the accompanying drawings, Fig. 1 is a longitudinal sectional view of a lighter embodying the present invention, shown in position upon a member such as the instrument board of a motor vehicle, and on an enlarged scale; Fig. 2 is a section on the line 2—2 in Fig. 1, looking from left to right; and Fig. 3 is a side elevation of the removable member

of the lighter, shown in actual size, with the heating element in the protruded position occupied when the lighter is used to light a pipe.

In the illustrated embodiment of the invention the removable member comprises a body 5, which is preferably moulded from some material, such as synthetic resin, which is a good insulator both of electricity and of heat. The forward portion of this body is covered by a metal sleeve 6, which is formed to provide a projecting rim, to facilitate manipulation of the device, and a flange partially covering the forward end of the body. The body is formed with a passage extending from end to end, but at the forward end this passage is contracted to form a ledge or shoulder 7.

Within the passage in the body, a plunger 8 is mounted, this plunger having the form of a tube open at both ends. The heating element 9, which has the usual form of a spiral of resistance metal, is supported at the rear end of the plunger. For this purpose it is embraced by metal cap 10, which is fixed on the plunger. A disc 11, of mica or other translucent insulating material, serves as a support for the heating element and for a central terminal, in the form of a hollow rivet 12, by which the central end of the heating element is fixed.

The plunger is guided in the body by means of a sleeve 13, which fits closely about it and is slotted, as shown in Figs. 1 and 2, so that it may be formed to spring inwardly and thus maintain firm frictional and electrical engagement with the plunger. The sleeve 13 has an outwardly-extending inclined flange 14, fitting closely within the body and serving to center the sleeve. Two pins 30, with beveled inner ends, are mounted in radial perforations in the body 5, and they are engaged, at their inner ends, by the flange 14. The plunger also is provided with a flange 31, at its forward end, and a spring 15, coiled about the plunger, is interposed between the two flanges. This spring has a tendency to press the flange 14 against the pins 30, which serve as abutments to retain the sleeve 13 in place, and it also acts to move the plunger

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forwardly in the body, so as to hold the heating element normally retracted, within the rear end of the body, as shown in Fig. 1. Between the forward end of the plunger and the shoulder 7, a lens or disc 16, of glass or other translucent material, is interposed, this lens being of such diameter that it may be moved freely within the passage through the body, but being normally held against the shoulder 7 by the pressure of the plunger.

The pins 30 are mounted loosely in their perforations, so that the pressure of the bevelled flange 14 against their ends tends to slide them outwardly, and this maintains them always in firm engagement with the sleeve 6. This mode of operation is desirable for the reason that the pins and the sleeve constitute parts of the electric circuit of the device, as hereinafter explained.

The stationary member of the lighter comprises a socket 17, drawn from sheet metal and adapted to and introduced into a suitable perforation in a panel or board 18, such as the instrument board of a motor vehicle.

A flange 19 is provided at the forward end of the socket, to rest against the board 18 as shown. The socket is held in place by means of a bolt 20 and a yoke 21, the bolt being fixed to the bottom or rear end of the socket and passing through the yoke so that, upon the tightening of a nut 25, the yoke is pressed against the rear of the board 18, thus drawing the socket firmly into position. Since it is convenient, also, to use the bolt 20 as an insulated terminal of the lighter, the head of the bolt, and the nut 23 by which it is fixed to the socket, are insulated therefrom by washers 22 and 24 of insulating material, and the nut 25 is also insulated from the yoke 21, by means of an insulating washer 26.

The inner end of the bolt cooperates, as a contact member or terminal, with the hollow rivet 12 which constitutes one terminal of the heating element 9. These parts are normally out of engagement with each other, as shown in Fig. 1. When the lighter is to be used, however, the user presses his finger against the lens 16, in the same manner that an ordinary electric button switch is used. The lens and the plunger are thus forced rearwardly within the body 5, causing the rivet 12 to press against the bolt 20. It will be understood that this bolt will be connected within a suitable source of current, in the usual manner, and upon the engagement of the terminals, as just described, the current will flow from the bolt through the rivet to the inner end of the heating element, from which it passes, through the cap 10, the plunger, the sleeve 13 and the pins 30, to the sleeve 6. The sleeve 6 is in engagement with the inner surface of the socket 17 which, in turn, is in electrical engagement with the metal plate 18. If this plate constitutes a portion of the electrically grounded metallic structure of the ve-

hicle, it will afford a return conductor for the completion of the circuit. The socket may, however, be grounded in any other manner. The heating element is energized by the circuit described, and when it has attained a sufficiently high temperature the removable member may be withdrawn from the stationary member, and used or passed about in the usual manner of such devices.

When the lighter is to be used for a cigar or a cigarette the plunger is permitted to remain in the position shown in Fig. 1, with respect to the body 5, so that the heating element remains retracted within the rear end of the body, where it is guarded against accidental contact with the person of the user. If a pipe is to be lighted, however, the user, while holding the removable member in one hand, may press against the lens with a finger of that hand, and thus move the plunger to its extreme rearward position, with the result of causing the cap 10 and the heating element to be protruded from the body, as shown in Fig. 3, to an extent sufficient to permit its introduction into the bowl of the pipe.

To insure an electrical contact between the sleeve 6 and the socket 17, and also to provide frictional means for retaining the removable member in place, the socket member is slotted at two or more points, so as to provide tongues 28, as shown in Fig. 1, which may be formed to spring inwardly against the sleeve. These tongues are shown as having slight inward projections, at their forward or free ends, engaging a corresponding recess or recesses in the sleeve.

The heating element is not directly visible when being heated, but the open passage through the plunger, together with the translucent materials in the disc 11 and the lens 16, permit the glow from the incandescent heating element to be visible at the front of the lighter, so that the user may know how long it is necessary to hold the circuit closed. This arrangement is not, broadly speaking, novel, since it has heretofore been proposed to provide the body of such an electric lighter with an opening through which a rearwardly located heating element is visible. A feature of the present invention, however, resides in the use of a reflecting surface within the light-conducting opening or passage, such surface being provided by polishing the interior of the hollow metal plunger. This surface will reflect light rays to the lens at such angles that they may be visible through a wide angle in front of the lens, whereas in lighters not provided with such reflecting surface, the comparatively faint glow of the heating element cannot be clearly perceived unless the eye is directly in line with the passage through which the light is conducted.

In a lighter of the inverted type, that is, in which the heating element is mounted at the rear end of the removable member, and its

supporting post or rivet is used as one of the circuit closing contacts, imperfect contact is likely to result after the device has been used for a short time, owing to the collection of metal oxide and charred tobacco upon this support or terminal. In the present construction the supporting terminal in question is the hollow rivet 12, and to cooperate with this member the bolt 21 is provided with a short rounded projection 27, adapted to enter the hollow in the rivet in consequence of the circuit-closing movement. This arrangement affords a slightly sliding engagement between the parts 12 and 27, which is adapted to dislodge any foreign matter which might otherwise prevent conductive contact between the metal surfaces.

It will be apparent that the several objects of the invention are attained in a very simple construction, particularly by reason of the fact that the mounting of the heating element upon a plunger, slideable within the body of the removable member, provides not only for the protrusion which is necessary in lighting a pipe, but also for the necessary movement to cause circuit-closing engagement of the contact members.

The invention claimed is:

1. In an electric cigar lighter of the wireless type, a removable member comprising a heating element, a body having, at one end, a recess in which the heating element is normally housed and guarded, and means, accessible for finger pressure at the opposite end of the body, for protruding the heating element from the body to facilitate the lighting of a pipe.

2. A removable member for a wireless cigar lighter, as set forth in claim 1, provided with a spring for retracting the heating element into the body.

3. In an electric cigar lighter of the wireless type, a removable member comprising a heating element, a body having a passage extending from front to rear, and means, extending through said passage, supporting the heating element at the rear end of the body and accessible for finger pressure at the front of the body, said means comprising a hollow plunger, through which light from the heating element is visible from the front, the plunger being slideable in said passage to cause protrusion of the heating element from the body.

4. A removable member, for a wireless cigar lighter, as set forth in claim 3, comprising, further, a button of translucent material seated normally at the forward end of the body and closing the end of the passage therein, said button being movable, by finger pressure, to move the hollow plunger for the purpose set forth.

5. In an electric cigar lighter of the wireless type, a removable member comprising a spiral heating element with a central termi-

nal, a disc of translucent material at the middle of which said terminal is fixed, a tubular plunger, a body having a passage therethrough in which the plunger is slidably mounted, and a helical spring interposed between the body and the plunger and arranged to move the plunger in a direction to retract the heating element within the end of the body.

6. In an electric cigar lighter of the wireless type, the combination, with a stationary member provided with a fixed terminal and with means for supporting and frictionally retaining a removable member, of a removable member comprising a heating element provided with a terminal, a body having a recess, at its rear end, in which the heating element is housed, means, supporting the heating element, slideable in the body and exposed for finger pressure at the forward end thereof, by which the heating element may be moved rearwardly, independently of the body, to cause engagement of said terminals, and a spring, in one of said members, for holding the terminals normally disengaged.

7. In an electric cigar lighter of the wireless type, the combination of a stationary member provided with a central terminal in the form of a pin, and a removable member provided, at its rear end, with a helical heating element, the inner end of the heating element being fixed to a terminal in the form of a tube adapted to receive the first-mentioned terminal with a sliding engagement.

8. A removable member, for a wireless electric cigar lighter, comprising a body, of insulating material, provided with a longitudinal passage, a metal plunger slideable in said passage, a heating element mounted on the rear end of the plunger and provided with an insulated terminal, a metal band on the outer surface of the body, and electrical connecting means, between the plunger and said band, having a resilient sliding engagement with the plunger.

9. A removable member for a wireless electric cigar lighter, as set forth in claim 8, in which said connecting means comprise a slotted sleeve concentric with and embracing the plunger.

10. A removable member, for a wireless electric cigar lighter, comprising a body, of insulating material, provided with a longitudinal passage, a metal plunger slideable in said passage, a heating element mounted on the rear end of the plunger and provided with an insulated terminal, a metal band on the outer surface of the body, conductive pins extending from said band to the interior of said passage, a resilient split sleeve embracing the plunger and having an inclined surface seated against the inner ends of said pins, and a spring interposed between the plunger and said sleeve and acting both to press the sleeve against the pins and to move

the plunger in a direction to retract the heating element within said passage in the body.

11. A removable member, for a wireless cigar lighter, comprising a body having a central passage and a shoulder at the forward end thereof, a hollow plunger slidable in said passage, a heating element carried on the rear end of the plunger, a lens loosely mounted, in said passage between said shoulder and the forward end of the plunger, and a spring coiled around the plunger and acting to move it forwardly so as to press the lens normally against the shoulder, the spring yielding to finger pressure, against the lens, whereby the plunger is moved rearwardly to protrude the heating element from the body.

12. A removable member, for a wireless cigar lighter, comprising a metal plunger, a heating element carried at one end thereof, a body, of heat-insulating material, with a longitudinal passage therethrough in which said plunger is slidably mounted, a metal sleeve on the outer surface of said body, an annular metal member loosely interposed between the plunger and the body and acting as a guide for the plunger, pins engaging the sleeve and extending into the passage in the body, said pins serving as abutments to support said annular member, and a spring coiled about the plunger and cooperating therewith at one end, the other end of the spring being seated against the annular member and acting to hold it in engagement with the pins.

CHARLES B. MAHAN.

Dec. 29, 1931.

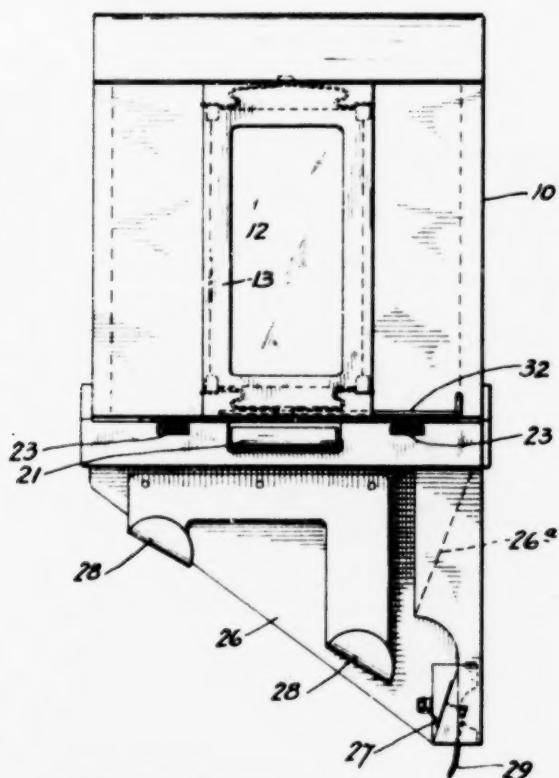
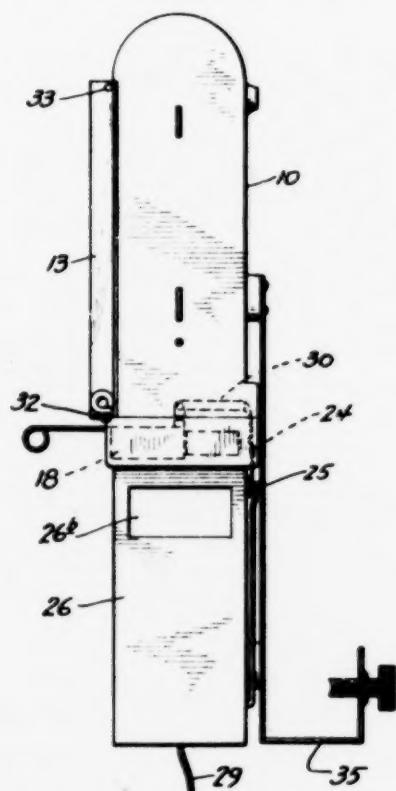
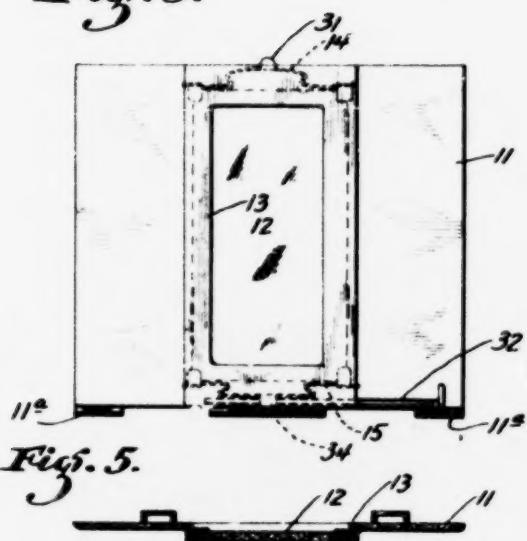
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1,838,363

DISPENSING AND LIGHTING DEVICE

Filed March 9, 1927

2 Sheets-Sheet 1

Fig. 1.*Fig. 2.**Fig. 3.**Fig. 4.**Fig. 5.*FRANCIS C. COPELAND
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DISPENSING AND LIGHTING DEVICE

Filed March 9, 1927

2 Sheets-Sheet 2

Fig. 6.

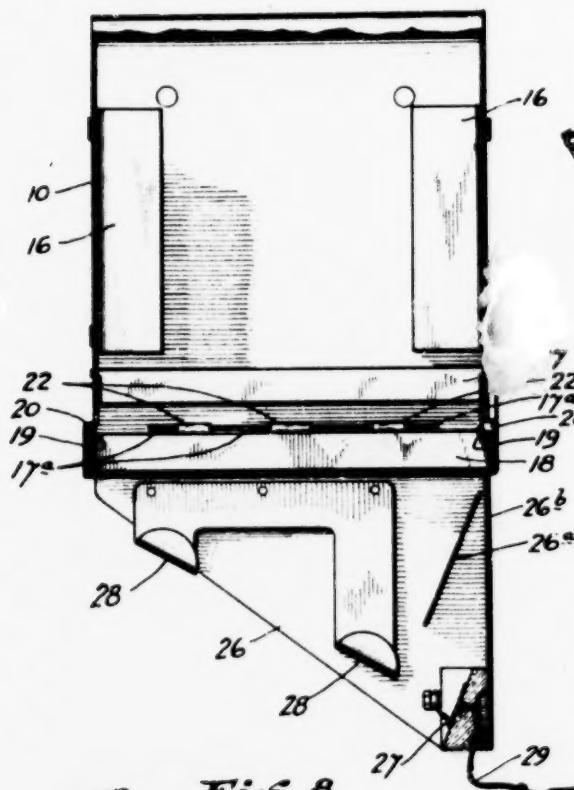


Fig. 7.

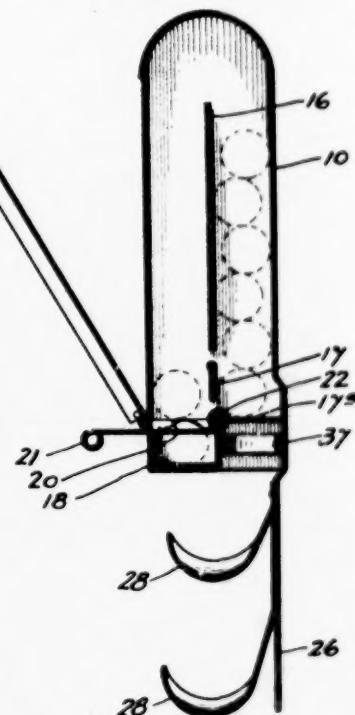


Fig. 8.

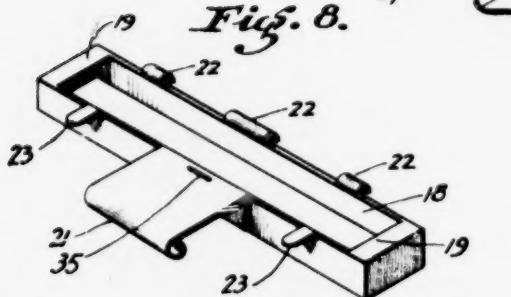


Fig. 9.

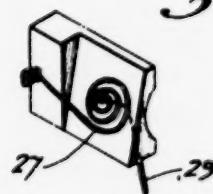
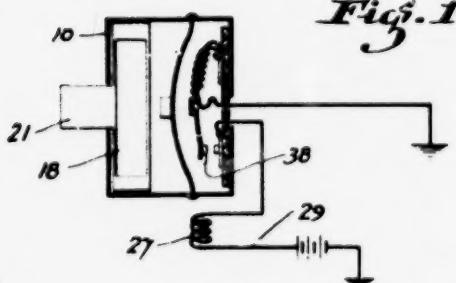


Fig. 10.



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UNITED STATES PATENT OFFICE

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DISPENSING AND LIGHTING DEVICE

Application filed March 9, 1937. Serial No. 173,833.

This invention relates to dispensing and lighting devices for cigarettes, cigars, and the like.

In a prior application filed by me November 12, 1923, Serial Number 674,381, entitled "Cigarette delivery and lighting device", I show and describe a dispensing and lighting device of this general character, wherein, by a single movement of a single lever, a cigarette can be delivered from a holder and brought into contact with an electric resistance element, and lighted.

The object of the present invention is to simplify and improve the construction and operation of a device of this character.

Among the more important improvements of the present invention is the delivery of the cigarette in inclined position to the electric resistance element. This insures that the cigarette, through the action of gravity, will force itself against the electric element with sufficient pressure to bring about lighting thereof without applying mechanical pressure to the opposite end. Moreover, in this inclined position the cigarette lights more readily than if it be held in horizontal position. Thus I am enabled to eliminate mechanical suction or draft means.

A further improvement resides in the dispensing mechanism. In said prior application I used a rotating cylinder for dispensing the cigarette, and this was liable to jam and also to tear the cigarette. In the present device I use a slidable dispensing element, movable into dispensing position by a thrust on the part of the operator; and this dispensing element is so arranged that when in dispensing position it forms a ground contact with the electric circuit, and thus causes the electric resistance element to be ignited.

Provision is made to prevent jamming of the dispenser or tearing of the cigarettes. I have also provided novel means to lock the dispensing element against movement, so as to prevent theft of the contents of the holder.

One form which my invention may assume is exemplified in the following description and illustrated in the accompanying drawings, in which

Fig. 1 shows a front elevation of the device;

Fig. 2 shows an end elevation of the same;

Fig. 3 shows a front view of the hinged door separated from the rest of the holder;

Fig. 4 shows a vertical sectional view of said door, taken through the glass panel thereof;

Fig. 5 shows a plan section of the same;

Fig. 6 shows a vertical longitudinal sectional view of the device;

Fig. 7 shows a vertical cross-section of the same;

Fig. 8 shows a perspective view of the dispensing element;

Fig. 9 shows a perspective view of the electric resistance element;

Fig. 10 shows a diagram of the electrical connections.

The present device comprises a box-like holder 10 having a front wall 11 hinged at its lower edge, as indicated at 11*. This front wall is fitted with a glass panel 12 carried in a rectangular frame 13. There is a leaf spring 14 at the top and a similar spring 15 at the bottom of the frame 13, which springs press upon the edges of the glass to form a cushion support therefor, and in addition control the locking means hereinafter to be described.

The holder as shown has a depth equal to two tiers of cigarettes or cigars, and these tiers are preferably kept separated by division plates 16. Near the bottom of the holder is a swinging gate 17 which permits the articles to pass from the back tier to the front, one at a time, when the front tier is depleted. The bottom of the box is open at its rear half and closed at its front half. Spaced above the opening in the bottom are projections 17* which support the back tier of cigarettes. Slidably mounted in the bottom of the box is a rectangular frame 18 of a size to receive a single cigar or cigarette. This frame is open both at its top and bottom, and has flanges 19 at its ends, upon which spring leaves 20 arranged within the holder are adapted to seat and hold the frame 18 compressed when the said frame is in re-traced position. Projecting out through 100

the front wall of the holder is a handle 21 by means of which the dispensing element can be moved back and forth within the holder. The frame 18 has curved lips 22 on 5 the top of its rear wall, extending up between the projections 17^a, to keep the cigarettes out of contact with the sharp edges and to assist in pulling a cigarette forwardly from the back tier to the front. This frame, when 10 moved inwardly, will carry with it a single cigar or cigarette, and will register with the open portion of the bottom and discharge the cigar or cigarette contained therein. When in this extended position, the handle 15 21 will prevent the cigars or cigarettes in the front tier from dropping downwardly. I also provide the front wall of this frame with lugs 23 to assist in preventing the cigarettes or cigars in the front tier from dropping down when the frame is extended.

When in its extended position, registering with the open portion of the holder, the dispensing element at its back wall will make contact with a conductor bar 24, which bar 25 is supported by a screw 25 secured to an apron 26 which extends downwardly from the holder. This bar 24 is electrically connected to a suitable resistance element 27 arranged on one end of the apron 26. This 30 apron is preferably open at its front and bottom, and has secured to it a pair of curved arms 28 which serve as a cradle to support a cigar or cigarette in inclined position with one end abutting against the resistance element. The angle at which these arms support a cigarette or cigar is sufficiently steep to insure that the cigarette will move by gravity into close enough contact with the lighting element to insure lighting. The inclined 35 position of the cigarette also tends to create a natural draft which makes it possible to effect a lighting thereof without applying suction to the opposite end of the cigarette. Arranged on the apron is a guide plate 26^a to 40 prevent the cigarette from lodging on top of the element 27. An opening 26^b is preferably formed in the apron, which in conjunction with the plate 26^a will form a flue 45 communicating with the lighted end of the cigarette.

The resistance element is connected to a suitable source of current, the circuit of which is closed by the pressure of the frame 18 against the bar 24. Preferably, I make 50 use of a grounded circuit, and I therefore show a single wire 29, leading from a battery to the resistance element. The holder itself being grounded, the circuit will be closed when the element 18 comes in contact 55 with the conductor bar 24. This bar 24 may also be extended above the dispensing frame 18, as indicated at 30, and contact can then be made between the frame and extension 30 when the said frame 18 is retracted by pressing downwardly on the handle 21, and tilt-

ing the frame upwardly against the pressure of the springs 20. This permits the igniter to be used without the dispenser.

These devices, while intended for use in many different situations, are frequently applied to the dash of an automobile. For that purpose I show a clamping bracket 35, and I also preferably provide a clip spring 36 on the end of the wire or cable 29, to facilitate hooking it up with the ignition system of the engine. Thus, to apply the device to a motor vehicle, all that is required is to bore a hole through the dash to permit the wire to pass therethrough, after which it can readily be connected to one of the ignition wires by 70 means of the clip spring 36.

There should preferably be a spring 37 in the bottom of the container, tending to force the slidable element 18 forwardly, so that the electrical contact will be broken the instant the hand is removed from the handle 21. However, as indicated in Fig. 10, I may provide a switch 38 in the circuit, arranged to be closed by the employment of the slidable dispensing element 18, said switch adapted to be opened by a thermostat when a pre-determined temperature is reached. This would obviate the necessity of the operator's holding the slidable dispensing element in rearward position during the time the cigarette 85 is being lighted.

On the return stroke of the slidable dispensing element, if the front tier of the container still contains any cigarettes, the swinging gate 17 will not open, and hence the cigarettes in the rear tier will be undisturbed. However, if this front tier or compartment 100 be empty, then the curved lips 22 will engage between the bottom cigarette in the rear tier, and pull it forwardly beneath the swinging gate to the front tier, where it will drop into the frame 18, ready to be dispensed on the next movement.

The locking mechanism is simple, and consists of means for locking the hinged front wall and also for locking the dispensing element against operation. The top spring 14 carries a lip 31 which extends upwardly behind the top wall of the box. It is retracted by inserting a rod or pin such as is indicated 110 at 32, through an opening 33 in the edge of the frame 13, whereby to depress the spring.

A similar locking means is provided for the dispensing element. The lower spring 15 carries a lip 34 which is adapted to extend down through an opening or slot 35 in the handle 21 of the frame 18. However, this lip is normally raised by keeping the spring 15 depressed, which is done by inserting a rod or pin 32 through an opening in the edge of the frame 13. This can be the same rod as is used for the top lock, and it will normally remain in place below, being withdrawn and carried away by the owner when it is desired to lock the dispensing element.

Various changes in the construction and arrangement of the several parts may be employed, without departing from the spirit of my invention as disclosed in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A cigarette dispensing and lighting device comprising a container to hold a supply of cigarettes, an ignition element, means to simultaneously drop a cigarette from said container and energize said ignition element, and means to catch said cigarette and guide the end thereof to rest by its own weight against said ignition element.

2. A cigarette dispensing and lighting device comprising a container, an ignition element, means to simultaneously drop a cigarette from said container and energize said ignition element, and inclined means to catch said cigarette and guide the end thereof to rest by its own weight against said ignition element.

3. In a device for dispensing and lighting cigarettes or the like, means to hold a supply of cigarettes, means to deliver the cigarettes one at a time therefrom, an igniting element, and means to receive and support the cigarette in vertically inclined position with lower end contacting with the igniting element.

4. In a cigarette dispensing and lighting device, a container for a supply of cigarettes, dispensing means slidably mounted at the bottom of said container to drop cigarettes, one at a time, from said container, spring-actuated means to lock said dispensing means and a rod removably inserted beneath said spring-actuated means for maintaining the dispensing means in inoperative position.

5. In a cigarette dispensing and lighting device, a container for a supply of cigarettes, dispensing means slidably mounted at the bottom of said container to drop cigarettes, one at a time from said container, an igniting element, means to support each cigarette in inclined position with one end thereof against said igniting element, means operated by said dispensing means to actuate said igniting element.

6. In a cigarette dispensing and lighting device, a container for a supply of cigarettes, an igniting element, means to simultaneously drop a cigarette from said container and to operate said igniting element, means to support said cigarette with the end thereof against said igniting element, and a flue disposed above said igniting element.

7. In an apparatus for lighting cigarettes or the like, an igniting element, means to energize said element, means to support a cigarette or the like with one end thereof resting by gravity against said igniting ele-

ment, and means to create a natural draft around said end of the cigarette.

8. In a cigarette dispensing and lighting device, a container for a supply of cigarettes, a dispensing means to drop one cigarette at a time from said container, an igniting element, means operated by said dispensing means to energize said igniting element, and a plurality of hooks, inclined from and in line with said ignition element, to receive a cigarette dropped from said container and guide the end thereof against said ignition element.

9. A cigarette dispensing and lighting machine comprising a container to hold a supply of cigarettes, an ignition element, means to simultaneously drop a cigarette from said container and excite said ignition element, and means to catch said cigarette and guide the end thereof to rest by its own weight against said ignition element.

10. A cigarette dispensing and lighting device comprising a container, an ignition element, means to simultaneously drop a cigarette from said container and excite said ignition element, means to catch said cigarette and guide the end thereof to rest by its own weight against said ignition element, and means to create a draft at the end of said cigarette.

11. In a cigarette dispensing and lighting machine, a container for a supply of cigarettes, a dispensing slide mounted at the bottom thereof and having an opening large enough to accommodate a cigarette, extending therethrough, means to close the bottom and open the top of the dispensing slide when the slide is in its normal outward position and to open the bottom and close the top when the slide is in its inward cigarette delivering position, an ignition element, and means to allow the cigarette to drop to an angular position, resting by its own weight thereon.

12. In a machine for dispensing and lighting cigarettes or the like, means to hold a supply of cigarettes, means to deliver the cigarettes one at a time therefrom, an igniting element, means to position the cigarettes with one end contacting with the igniting element, and means to cause a natural draft around the igniting element to light the cigarette.

13. In a cigarette dispensing and lighting machine, a container for a supply of cigarettes, dispensing means slidably mounted at the bottom of said container to drop cigarettes, one at a time, from said container, an ignition element, means to catch each cigarette and guide one end thereof against said ignition element where it rests by its own weight, means operated by said dispensing means to actuate said ignition element, and means to create a natural draft through said ignition element and across the end of a cigarette placed thereagainst.

14. In a cigarette dispensing and lighting machine, a container for a supply of cigarettes, an ignition element, means to simultaneously drop a cigarette from said container and to operate said ignition element, means to catch said cigarette as it drops and guide the end thereof against said ignition element, and a flue having a large opening at the bottom and a smaller opening at the top disposed above said ignition element to provide a natural current of air across said ignition element and up said flue when said ignition element is heated.

15. In a cigarette dispensing and lighting machine, a container for a supply of cigarettes, dispensing means slidably mounted at the bottom of said container to drop one cigarette at a time from said container, means to receive a cigarette as it is dropped from said container, a flue open at the top and bottom attached to the container and below one side thereof, an ignition element releasably attached to said flue adjacent the end of a cigarette in said receiving means, and means operated by said dispensing means to heat said ignition means and thereby produce a natural draft across said ignition element and up said flue.

16. In an apparatus for lighting cigarettes or the like, a cigarette dispensing means, an igniting element, means to energize said element, means to support a cigarette or the like with one end thereof resting by gravity against said igniting element, and means to create a natural draft around said end of the cigarette.

17. In a cigarette dispensing and lighting machine, a container for a supply of cigarettes, a dispensing means to drop one cigarette at a time from said container, an ignition element, means operated by said dispensing means to excite said ignition element, and a plurality of hooks, inclined from and in line with said ignition element, to receive a cigarette dropped from said container and guide the end thereof against said ignition element.

FRANCIS C. COPELAND.



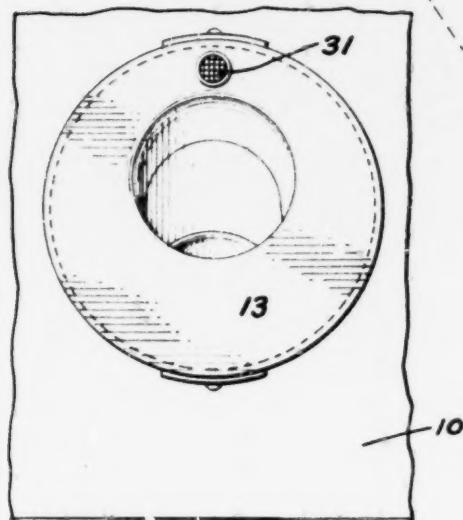
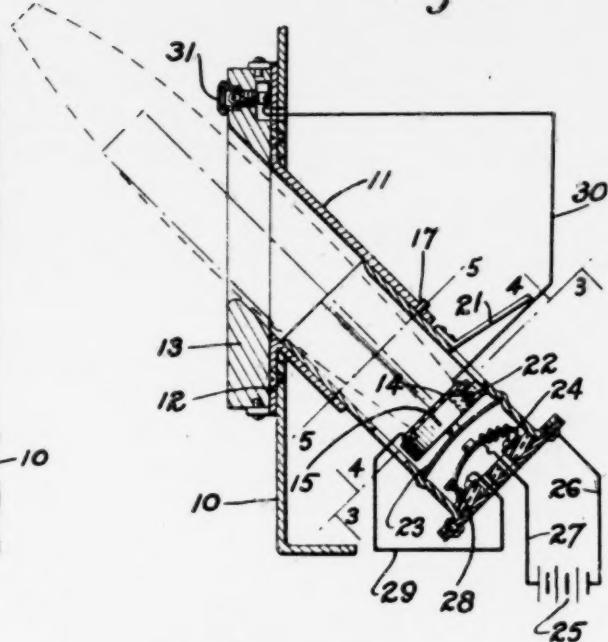
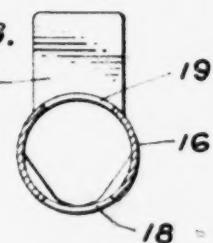
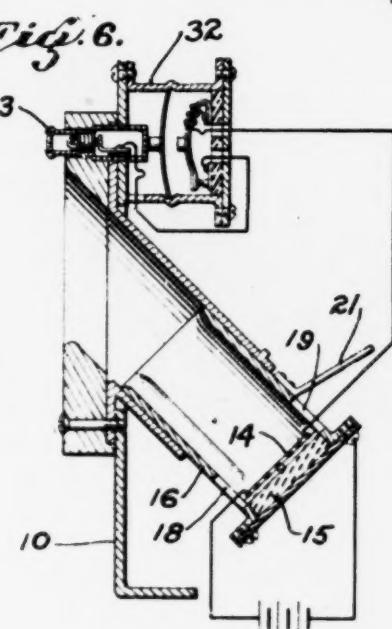
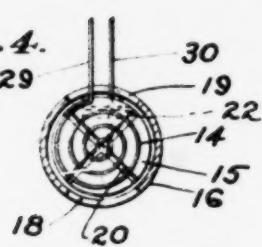
Feb. 9, 1932.

F. C. COPELAND

1,844,206

LIGHTER FOR CIGARS AND CIGARETTES

Filed April 18, 1927

Fig. 1.*Fig. 2.**Fig. 3.**Fig. 6.**Fig. 4.**Fig. 5.*INVENTOR.
FRANCIS C COPELAND.BY
Lowndes, Loftus & Abbott
ATTORNEYS.

Patented Feb. 9, 1932

1,844,206

UNITED STATES PATENT OFFICE

FRANCIS C. COPELAND, OF SAN FRANCISCO, CALIFORNIA, ASSIGNEE TO ARCHIBALD W. DIACK, OF ANN ARBOR, MICHIGAN

LIGHTER FOR CIGARS AND CIGARETTES

Application filed April 18, 1937. Serial No. 184,571.

This invention relates to an electric lighter for cigars and cigarettes.

The principal object of the invention is to provide a simple form of lighter, comprising an electric igniting element adapted to be attached to a support such as the instrument board of an automobile, whereby cigars or cigarettes, when applied to the igniting element, will be lighted without the use of suction. This is brought about by causing the cigar or cigarette to occupy an inclined position, with the end to be lighted disposed downwardly, and arranging vent openings adjacent the igniting element, so that the air will get beneath the end of the cigar or cigarette and create a draft upwardly therethrough.

When applied to an automobile, the igniting element may conveniently be connected to the source of current which supplies the ignition to the engine, and the air currents produced by the cooling fan and the travel of the vehicle will be helpful in inducing a draft through the cigar or cigarette. Provision is made for closing the circuit, either by pressing a switch button by hand or by a thrust of the cigarette or cigar against the igniting element, and the said circuit may be opened automatically after the lapse of the required time to light the cigar or cigarette, through a thermostatic device.

In a device such as forms the subject-matter of the present application, it is not necessary to hold the cigar or cigarette in the mouth, nor to bring the igniting element into contact therewith. All that is required is to simply thrust the cigar or cigarette into the inclined guide and against the igniting element, whereupon the hand may be removed and the cigar or cigarette left in place until it is properly lighted, at which time the current is automatically cut off and the cigar or cigarette is in lighted position, ready to be smoked.

In the accompanying drawings,

Fig. 1 shows a front elevation of a device embodying my invention;

Fig. 2 shows a vertical central transverse section of the same;

Fig. 3 shows a section taken on the line 3—3 of Fig. 2, looking outwardly;

Fig. 4 shows a sectional view on line 4—4 of Fig. 2, looking inwardly;

Fig. 5 shows a sectional view on the line 5—5 of Fig. 2;

Fig. 6 shows a vertical central sectional view of a modified arrangement of the circuit-controlling means.

A supporting wall is shown at 10, which may be considered as the instrument board of an automobile. A tubular guide 11, arranged at a downward angle on a flange 12, extends through an opening in the board and is secured in place by screws passing through the flange and board. The flange is preferably covered by an escutcheon plate 13.

The igniting element includes a suitable resistance wire 14, arranged spirally on a refractory base 15 and supported in the end 70 of a tubular extension 16. This tubular extension fits telescopically into the guide member 11 and is held therein by a bayonet joint 17, so that the igniting element may be conveniently inserted or removed without disturbing the other parts of the device.

Adjacent the igniting element the tubular extension has a lower vent opening 18 and an upper vent opening 19, whereby a current of air may pass in close proximity with the end of the cigar or cigarette, to facilitate lighting. Lighting is further facilitated by forming the refractory base with grooves 20, whereby the air will circulate beneath the resistance wires, and hence beneath the end of the cigar or cigarette. Due to the angle of the guide member, the cigar or cigarette will occupy an inclined position, with the end to be lighted extending downwardly so that air passing the lighted end will tend to move upwardly through the tobacco, thus facilitating combustion and making it unnecessary to apply suction to the cigar or cigarette during the time it is being lighted. The force of this draft through the cigar or cigarette is considerably increased where the device is applied to an automobile, since in that case the cooling fan will throw a current of air rearwardly, and considerable movement of air will also result from the travel of the

vehicle. I prefer to position a deflector plate 21 adjacent the top opening 19, so as to attract the current of air onto the igniting element and beneath the end of the cigar or cigarette. With the ventilating openings 18 and 19 above and below the igniting element, a flue action will be present at all times. This will induce a current of air around the end of the cigar or cigarette and between the resistance element and its base, which will be sufficient to cause lighting without suction, even though the tubular member be in a horizontal position.

As shown in Fig. 2, the base of the igniting element is hinged at 22, and rests against a buckling spring 23. Pressure of the cigar or cigarette against the igniting element will control the buckling spring past center, where it will contact with a thermostatic bar 24. This bar forms a circuit closer for a one-line circuit. The source of current is indicated at 25, and is grounded at one side by a lead 26. On the other side of the current source is a lead 27, coiled around the thermostatic bar and in contact therewith. The other end of the bar is free, and when pressed upon by the buckling spring is adapted to move into contact with a contact plate 28, to which another lead 29 is connected. This lead 29 extends to the resistance wires or igniting element, and the other side of the resistance wires is connected with a lead 30 which is mounted onto the frame of the device. A little signal lamp 31 is cut into the lead 30 and arranged on the escutcheon plate to indicate the condition of the circuit.

The thermostatic bar is so arranged that after a lapse of time sufficient to supply the required temperature to the igniting element for lighting a cigar or cigarette, the bar will expand against the buckling spring and throw the latter back to initial position, thus leaving the circuit broken, where it will remain until a subsequent time when a cigarette or cigar is inserted.

In the modification shown in Fig. 6, the igniting element is stationarily mounted in the end of the tubular extension 16 and a thermostatic circuit control is arranged in a housing 32 adjacent the signal light. The buckling spring in this case is moved to position where the thermostatic bar closes the circuit by provision of a cage 33 which carries the signal light, said cage being slidably mounted in the escutcheon plate, and capable of endwise movement when pressure is applied thereto with the thumb or finger.

Various changes in the construction and arrangement of the several parts herein shown and described may be employed without departing from the spirit of my invention as disclosed in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A lighter for cigars and cigarettes, comprising a guide, an electric igniting element at the lower end thereof, manual means for closing a circuit through said igniting element, and thermostatic means for opening said circuit.

2. A lighter for cigars and cigarettes, comprising a guide, an electric igniting element at the lower end thereof, means actuated by movement of the igniting element under the thrust of a cigar or cigarette to close the circuit through said igniting element, and thermostatic means for opening the said circuit.

3. A lighter for cigars and cigarettes, adapted to be attached to the instrument board of an automobile, comprising a guide for the cigar or cigarette secured to the instrument board and extending through an opening therein and downwardly at an angle, said guide being of sufficient length to independently support a cigar or cigarette, an igniting element at the lower end of the guide with which the end of the cigar or cigarette contacts and rests by gravity thereon, and ventilating means at the lower end of the guide to expose the end of the cigar or cigarette to a current of air, whereby a draft will be created around the end of the cigar or cigarette to cause lighting thereof through natural draft.

4. A lighter for cigars and cigarettes comprising a socket of sufficient length and so positioned as to independently support the cigar or cigarette, an electric igniting element at the inner end of the socket and comprising a support of insulating material, and a resistance wire arranged on said support, and means to permit air to circulate upwardly through the inner end of the socket and between the wire and the support, whereby a cigar or cigarette may be lighted through a natural draft.

5. A lighter for cigars or cigarettes, comprising a socket of sufficient length so arranged as to independently support a cigar or cigarette, an electric igniting element at the inner end of the socket, normally inactive, and means engageable by the cigar or cigarette when in the socket, to activate the igniting element.

6. A lighter, comprising in combination a vertical support, a socket on said support, of sufficient length and so positioned as to receive and support a cigar or cigarette, said socket being formed of telescoping sections detachably connected together, and an electric igniting element arranged on the innermost section.

7. A lighter for cigars and cigarettes, comprising a socket of sufficient length and so positioned as to independently support a cigar or cigarette, an electric igniting element at the inner end thereof, comprising an insulating base, resistance wires arranged thereon, and grooves formed in said base be-

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neath the resistance wires, permitting circulation of air between the wires and base.

8. A lighter for cigars and cigarettes, adapted to be attached to the instrument board of an automobile, comprising a guide secured to the instrument board of sufficient length and so arranged as to independently support a cigar or cigarette, an igniting element at the inner end of the guide, ventilating means at the inner end of the guide to expose the end of the cigar or cigarette to a current of air, whereby a draft will be created around the end of the cigar or cigarette to cause lighting thereof through natural draft, means to control the circuit for activating the igniting element, and means on the instrument board to indicate when said element is activated.

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Jan. 30, 1934.

J. H. COHEN

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CIGAR LIGHTER

Filed April 22, 1929

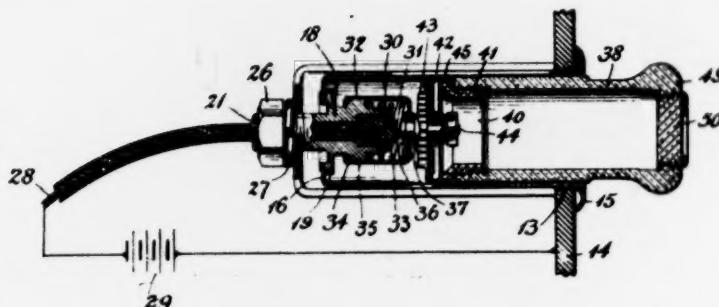


Fig. 1.

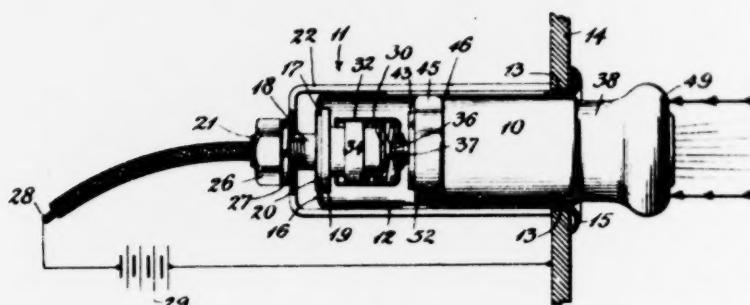


Fig. 2.

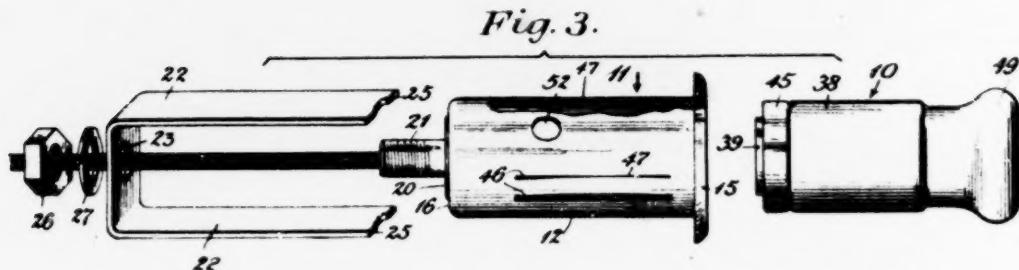


Fig. 3.

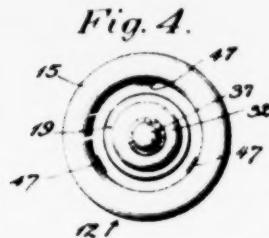


Fig. 4.



Fig. 5.

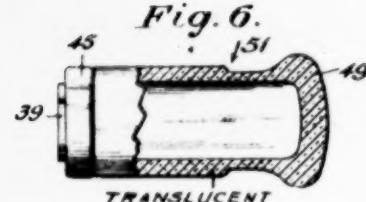


Fig. 6.

INVENTOR.
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BY 
ATTORNEY

Patented Jan. 30, 1934

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UNITED STATES PATENT OFFICE

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CIGAR LIGHTER

Joseph E. Cohen, Bridgeport, Conn.

Application April 22, 1929. Serial No. 357,630

8 Claims. (Cl. 219—32)

This invention relates to electric cigar-lighters, and more particularly, to that type of cigar-lighter which comprises a holding device adapted to be supported on an instrument board or other suitable support, and an igniting unit adapted to be mounted on the holding device for quick and complete removal and replacement after a heating element carried by the igniting device has been brought to incandescence so that the heating element may be applied to the end of a cigar or cigarette to ignite the same.

An object of the present invention is to provide an improved cigar-lighter of the kind referred to, in which the holding device comprises a socket and the igniting device a plug to be inserted in and supported by the socket, and provides means for facilitating the mounting of the socket on the instrument board of a motor vehicle.

Another object of the invention is to provide an automatic switch in the socket adapted to close a circuit through the igniting unit when the igniting unit, which is supported in two-pole engagement with the holding device, is moved inwardly on the holding device.

A further object is to provide improved means on the holding device for resiliently holding the igniting unit on the holding device against accidental or unintentional removal.

And a still further object of this invention is to provide an improved igniting unit and heating element therefor.

Other features and advantages will hereinafter appear.

In the accompanying drawing which illustrates one form of the invention, that at present preferred—

Figure 1 is a sectional view of the holding device and igniting unit mounted in position on a suitable support, such as the instrument board of a motor vehicle.

Fig. 2 is a view similar to Fig. 1, but showing the igniting unit in elevation, and showing the latter in the position which it occupies when a current-supply circuit through the heating element is closed.

Fig. 3 is a disassembled view of the igniting unit, the sleeve constituting the socket for it, and the plate and accompanying means for securing the socket to the instrument board.

Fig. 4 is a front elevation of the holding device with the igniting unit removed.

Fig. 5 is an elevation showing the end of the igniting unit which carries the heating element.

Fig. 6 is a sectional view of a modification of the igniting unit shown in Figs. 1 to 3.

The electric cigar-lighter of the present invention, as shown in the accompanying drawing, comprises an igniting unit 10 and a holding device 11, the former being mounted on the latter for quick removal and replacement. The holding device forms a socket for receiving the igniting unit which is cylindrical and constitutes a plug.

The holding device includes a sleeve 12 adapted to be inserted in a hole 13 in an instrument board 14 or the like and has an outwardly extending flange or bead 15 at its forward end adapted to engage the face of the instrument board at the margin of the hole 13 and limit the inward movement of the sleeve through the hole in the instrument board 14. At its inner end the sleeve 12 is provided with an end wall 16 having an aperture 17 in which a post-like member 18 is mounted.

This post-like member 18 has a flange 19 engaging the inner side of the end wall 16 and another flange 20 engaging the outer surface of the end wall 16 and formed by peening over the material of the post adjacent the flange 19. The post 18 has a screw-threaded end portion 21 over which a clamping plate 22 is adapted to be placed after the sleeve 12 has been inserted in the hole in the instrument board, the clamping plate 22 having an aperture 23 fitting over the threaded portion 21 of the post. The clamping plate 22 is U-shaped and has forwardly extending arms 24 of such length that the edges 25 thereof are adapted to engage the rear face of the instrument board when the clamping plate is placed over the threaded portion 21 of the post.

After receiving the clamping plate 22, the threaded portion 21 of the post is adapted to have placed thereon a nut 26 and a washer 27, and when the former is tightened, it drives the clamping plate 22 forwardly against the back of the instrument board and at the same time draws the sleeve 12 backwardly so that the flange 15 engages firmly against the front face of the instrument board while the ends 25 of the clamping plate 22 are firmly clamped against the back of the instrument board.

The holding device also includes means for carrying current to the igniting device and a switch mechanism for normally opening the circuit leading to the igniting device. These means comprise a wire 28 connected to a battery 29 or other suitable source of current, which passes through a central bore in the post 18 and is connected at its end to a contact 31 mounted in a

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bushing of insulating material 30 mounted in the post 18. This contact terminal 31 is not, however, directly engaged by the igniting unit, but is located within a sleeve or cap 32 slidably mounted on the post 18 and normally held in the position shown in Fig. 1 by a spring 33 with a flanged inner end 34 thereon engaging against a flange 35 on the post. At the center of its end portion, the cap 32 is provided with a contact 36 adapted to engage the live contact 31 on the post when the cap is moved inwardly against the tension of the spring 33, as shown in Fig. 2. This contact 36 is electrically connected with an external contact 37 adapted to engage the heating element or some other part of the igniting device to make contact therewith, and the contacts 36 and 37 are insulated from the cap 32.

The other contact on the holding device comprises a sleeve 12 which, being in electrical engagement with the instrument board, is connected to the other side of the battery 29 through the ground of the vehicle. If the instrument board should be made of wood or other insulating material, the other side of the battery may be connected to the sleeve 12 by a wire placed between the washer 27 and the clamping plate 22.

The igniting unit 10 comprises a cylindrical body 38 carrying at one end a heating element 39. This heating element comprises a sleeve 40 of lava or the like having screw-thread engagement 41 with the end of the body 38. The lava sleeve 40 supports a disk 42 carrying a coil 43 of resistance wire the outer convolution of which is secured to the disk while the inner end is carried by a post 44 insulated from the disk 42 substantially as shown in my co-pending application, Serial No. 304,745, filed September 8th, 1928, to which reference should be had for a more complete understanding of the means for holding the heating element and plate together. In the present case, the plate or disk 42 is held to the lava sleeve 40 by a metal ferrule 45 spun around the outer edge of the plate 42 and over a flange on the lava body.

The diameter of the ferrule 45 is such that it has rubbing contact with the internal wall of the sleeve 12 when the igniting unit is supported in the sleeve; and the post 44 is located in line with the contact 37 so that when the igniting unit is placed in the holding device, as shown in Fig. 1, the post 44 engages the contact 37.

It will thus be seen that the igniting unit has two-pole electrical engagement with the holding device when supported on the holding device in normal position, as shown in Fig. 1, i. e., when not translating current.

To cause current to flow through the resistance wire 43 so that the heating element may be brought to incandescence, the igniting unit is pressed inwardly from the position shown in Fig. 1 to that shown in Fig. 2, and by this movement the cap 32 is caused to slide on the post 18 so as to bring the contact 36 into electrical engagement with the live contact 31 in the post 18. Current may then flow from the battery 29 through the wire 28, contact 31, contacts 36 and 37 to the post 44. Then, through the coil of resistance wire 43 to the plate 42, then to the ferrule 45 and from that to the sleeve 12 back through the ground to the battery 29.

So that the igniting unit may be held in the holding device, against accidental removal and yet without employing interlocking devices or detents which would cause in a jerky motion to result when trying to remove the igniting unit,

the present invention provides slits 46 in the sleeve 12 so that the strip 47 between the slits may be biased inwardly to frictionally engage the ferrule 45 and the body 38 of the igniting unit to resiliently hold the latter in the socket 12. In addition to having the friction above specified, the resilient strips 47 by engaging the ferrule 45 form good electrical contact therewith.

While the resilient strips 47 engage the igniting unit with sufficient force to hold it in the socket against accidental removal, its holding action is such that the igniting unit will be moved from the position shown in Fig. 2 to that shown in Fig. 1, where the circuit is opened, by the spring 33 against the resistance of the resilient strips 47. Hence, should the igniting unit be pressed inwardly and instead of being bodily removed from the holding device to be applied to a cigar or cigarette to ignite the same, is merely released again, the spring 33 will cause the igniting unit to be slid outwardly relative to the sleeve and permit the circuit to be opened between the contacts 31 and 36.

Since the igniting unit is slid into the holding device with the heating element foremost where it is concealed from the view of the user, the present invention provides means for enabling the user to ascertain when the resistance wire 43 has been brought to incandescence. To do this, the plate 43 is provided with apertures 48 and the lava body 40 and body 38 are made hollow, thus permitting light emanating from the incandescent resistance wire 43 to pass through the interior of the body 28. In one form of the invention, that shown in Figs. 1 to 3, the end wall 49 of the body 38 is provided with a window or lens 50 through which the glow of light may be seen by the user.

In the form of the invention shown in Fig. 6, however, the end wall 49 is closed and the body 38 is made, as indicated, of translucent material. When this material is employed, the entire head 51 of the igniting unit is caused to glow when the heating element has been brought to incandescence.

The sleeve 12 is provided with ventilating apertures 52 to dissipate the excess heat which may result from holding the igniting unit 10 in closed-circuit position for a longer period than is necessary to bring it to incandescence.

The invention shown herein is an improvement on my copending applications, Serial No. 325,877, filed December 13, 1928, and Serial No. 352,376, filed April 4, 1929, in which applications I have disclosed and broadly claim means for indicating the incandescence of the heating element.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new and for which it is desired to obtain Letters Patent is:—

- An electric cigar-lighter comprising a holding device having a sleeve adapted to extend through a hole in an instrument board of a motor vehicle or the like; a flange adapted to engage the face of the instrument board at the margin of the hole; a reduced threaded member at the inner end of said sleeve; a U-shaped plate fitting over said reduced threaded member and having forwardly extending arms surrounding said sleeve and having their forward ends facing the rear face of the instrument board; and a threaded member cooperating with the threaded member on the sleeve adapted to engage the

U-shaped bracket and draw the flange on the sleeve against the front face of the instrument board and push the ends of the U-shaped plate firmly against the back face of the instrument board to firmly hold the holding device in operative position on the instrument board.

2. In an electrical device of the class described, a holding device and an igniting unit adapted to be supported on the holding device for quick removal and replacement, one of said devices constituting a plug and the other constituting a socket to receive the plug, and one of said devices having resilient means to engage the other and frictionally hold the two devices together, said igniting device having a heating element and being held by said resilient means in two-pole electrical engagement with the holding device when not translating current; and a switch device on said holding device comprising a movable circuit closer movable to position to close a current supply circuit through said heating element by movement of the igniting device relative to the holding device against the resistance of said resilient means, said switch being normally biased to move the igniting unit to open circuit position and being adapted to move the igniting unit against the resistance offered by said resilient means.

3. In an electric cigar-lighter, an igniting unit adapted to be mounted on a tubular holding device for quick removal and replacement, said igniting unit comprising: a cylindrical body portion adapted to extend into said tubular holding device; and a heating element including a resistance element and support therefor removably mounted in the end of the body which extends into said tubular holding device, said heating element being adapted to be brought to incandescence while supported in said holding device, and said body and support for the heating element being hollow to permit light emanating from the incandescent heating element to be seen by the user while the igniting unit is still located in the holding device.

4. In an electric cigar-lighter, an igniting unit adapted to be mounted on a tubular holding device for quick removal and replacement, said igniting unit comprising: a cylindrical body portion adapted to extend into said tubular holding device; and a circular heating element removably mounted in the end of the body which extends into said tubular holding device, said heating element and body being in light conducting relation and the body being of translucent material so that the glow resulting from incandescence of the heating element can be viewed by the user without removing the igniting unit from the holding device.

5. An electric cigar-lighter comprising a holding device and an igniting unit adapted to be

mounted on the holding device for quick removal and replacement, said igniting unit comprising a cylindrical body portion and a heating element mounted at one end of said body portion and having a resistance wire and a ferrule in contact with one end of the resistance wire, and said holding device comprising a tubular member or sleeve of metal into which a substantial portion of the cylindrical body of the igniting unit carrying the heating element is adapted to extend to be supported therein, said metal sleeve being slit and normally biased to resiliently engage the ferrule of the heating element when the latter is located in the sleeve to retain the igniting unit within the sleeve against casual removal, current being conducted from said ferrule to said sleeve by said biased portions of the sleeve.

6. A heating element for cigar-lighters comprising a cylindrical body of insulating material having a reduced neck provided with means for securing it to an igniting element; a heater coil; mounting means therefor; means for securing the heater coil mounting means on the body of insulating material comprising a metallic ferrule engaging one end of the heater coil and constituting a contact thereof, said body being hollow and said mounting means being capable of allowing the passage of light therethrough into the hollow portion of the body.

7. In an electric cigar-lighter, an igniting unit adapted to be mounted on a tubular holding device for quick removal and replacement, said igniting unit comprising: a cylindrical body portion adapted to extend into said tubular holding device; and a heating element mounted on the end of the body which extends into the tubular holding device, said heating element and body being made in light conducting relation and the body being of translucent material so that the glow resulting from incandescence of the heating element can be viewed by the user without removing the igniting unit from the holding device.

8. In an electric cigar-lighter, an igniting unit adapted to be mounted on a tubular holding device for quick removal and replacement, said igniting unit comprising: a cylindrical body portion adapted to extend into said tubular holding device and having an operating knob protruding from the holding device; and a heating element mounted on the end of the body which extends into the tubular holding device, said heating element and body being in light conducting relation and the knob being of translucent material so that the glow resulting from incandescence of the heating element can be viewed by the user without removing the igniting unit from the holding device.

JOSEPH H. COHEN. 135

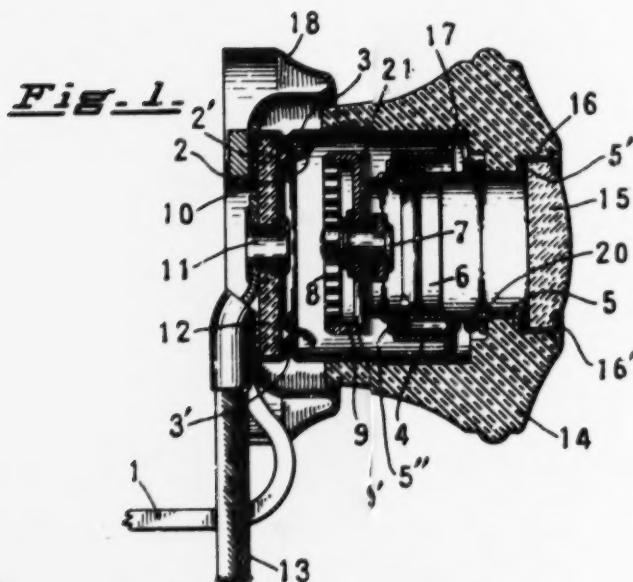
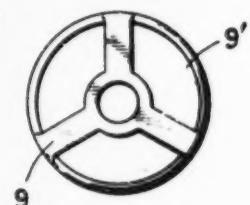
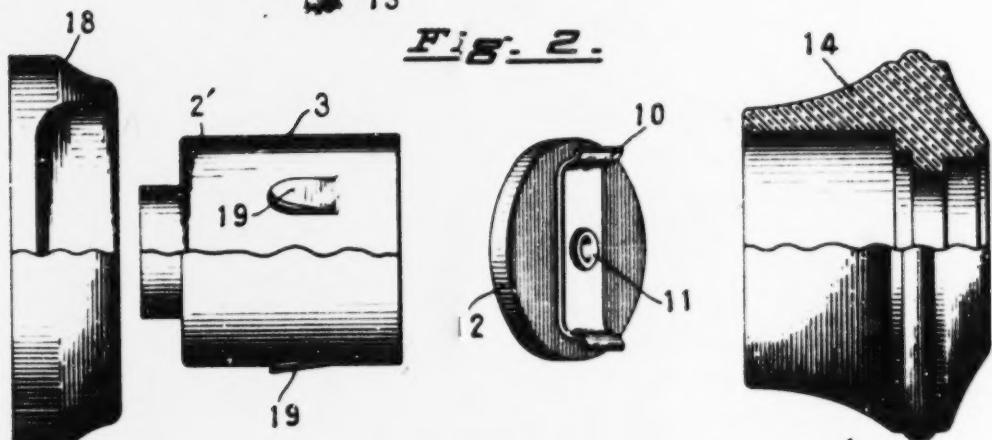
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ELECTRIC CIGAR LIGHTER

Filed April 10, 1931

Fig. 4.Fig. 2.Fig. 3.

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ELECTRIC CIGAR LIGHTER

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Conn., a corporation of Connecticut

Application April 10, 1931, Serial No. 529,933

26 Claims. (CL 219—32)

This invention relates to lighters for cigars, cigarettes, etc. of the type which are adapted to be heated on its support and then readily withdrawn from the electric supply connections for lighting a cigar, etc.

An object is to provide an inexpensive device of this type in which the heater element is carried on the inner end of a removable member.

Another object is to provide such a device which is of simple construction having an electric and heat insulating member serving as one of the bearing members for a slidable bearing during heating, removal and subsequent insertion.

Another object is to provide a device in which the igniter is housed and yet in which the glow of the igniter can be seen when it is heated.

Fig. 1 is a cross section of one embodiment of this invention.

Fig. 2 shows some of the parts before assembly.

Fig. 3 shows the heater element and some of the parts carried by the removable insulating socket member.

Fig. 4 is a detail of the heater element support.

Referring to Fig. 1, some customary support such as the usual bracket 1 attached to the dashboard of an automobile carries a supporting plug or tubular outer contact 3, which is secured thereto by the bent flange 2 fitting within and around a perforation in said bracket.

The outer end of said plug 3 is engaged by the wall or cup-shaped member or contact ring 4 slidable on the metal tube or sleeve 5. Also carried by the metal sleeve 5 is the removable metal base member 6 to which is clamped the heater coil or element 8 and its support or contact ring 9 by the stud or rivet 7. Yieldable interior contact member 10 is secured within the supporting plug as illustrated by means of the eyelet 11 passing through the disc 12 of insulating material such as fibre or a phenolic condensation product or a mixture thereof with asbestos. Disc 12 is held between the wall 2' and the bead 3'. The conducting lead 13 is secured as shown to the headed eyelet 11.

Slidably bearing on the plug 3 is the supporting knob or socket member 14 preferably of insulating material such as a phenolic condensation product or the like. As shown in Fig. 1, the right end of the metal sleeve 5 is closed by the glow window 15 of either transparent or translucent material held in place by the spun-over flange of the ferrule 16 to which is secured the socket and sleeve members 14 and 5.

The outer end 5' is flanged over to hold the

ferrule 16 in place and to secure it in the socket or knob 14, the flange 20 serving as an abutment. When the sleeve 4 is in place the flange 5' is turned to prevent the parts from separating. The coil spring 17 is compressed between the flange 20 and 60 the flange 4' so as to normally keep the socket member 14 and the lighter element flange 9 carried thereby out of contact and away from the yieldable contact member 10. An ornamental dash plate 18 may be secured to the plug in the 65 manner illustrated. If desired yieldable retaining portions 19 may be stamped out from the sides of the plug 3 to assist in frictionally retaining the socket member in place, although if desired such may be eliminated.

The socket member 14 may have a sufficiently tight fit upon the plug 3 so that no such members 19 are needed, or if desired the engagement between the plug 3 and socket member 14 may be looser if the plug is mounted to extend in an upward direction so that gravity may hold the socket member in place.

The electric current enters through the conductor 13, thence to the yieldable contact members 10 and when the socket member 14 is pressed 80 to the left, in Fig. 1, so as to close the circuit between the yieldable contacts 10 and the heater supporting cup or ring member 9, the current then flows through the heater.

From the center of the heater the current 85 passes through the stud 7, unit base 6, sleeve 5, cup or wall member 4 to the plug 3 which is grounded to the frame of the car. When the heater element becomes incandescent its condition may be viewed through the glow window 90 15 and when hot enough the socket member may be withdrawn. In withdrawing the socket member 14 the cup member 4 and spring 17 are carried by the sleeve 5 and the socket member 14 provides a convenient heat insulated grip or handle portion while the cigar or cigarette is being lighted from the heater element 8.

In assembling this lighter the insulating disc 12 carrying the yieldable contacts 10 is inserted into the plug 3 from the right end, as shown in 100 Fig. 2, after which the flanges holding the disc in place may be bent up as illustrated in Fig. 1. The outer end of the plug 3 is then bent inwardly at 3' to provide an engagement for the cup 4 carried by the socket member 14.

The heater element mounted within its supporting ring 9 is held in place by the stud 7 clamping the members 9 and 6 together with the insulating disc 12 therebetween. The portions of the members 9 and 6 which are contiguous 110

ous the insulating disc 21 are not solid or imperforate but are either spoke-shaped or provided with perforations such as 9' as shown in Fig. 4 through which light from the heater 5 element is passed to permit the heater element to be viewed through the glow window 15. The insulated disc 21 must, of course, be of some translucent or transparent or perforated insulating material.

10 The unit base 6 is secured within the sleeve 5 by means of a yieldable horseshoe shaped detent or otherwise so as to permit the base 6 to be normally carried and movable with the sleeve 5 but permit removal thereof for renewal of 15 the heater element when necessary.

In order to assemble the parts shown in Fig. 3 within the socket member 14, the sleeve 5 is first inserted in the socket member 14 from the left and the ferrule 16 inserted from the right. The 20 outwardly bent flange 5' on the right end of the sleeve 5 may then be formed to secure the ferrule 16 in place, after which the glow window 15 can be inserted and the ferrule 16 bent down as illustrated at 16' to retain it in place. The 25 spring 17 is next placed on the sleeve 5 and then the cup member 4 placed over the spring, after which the outwardly bent left end 5'' of the sleeve 5 may be formed to retain the cup and spring permanently in place on the sleeve 5.

30 The wearing character of the socket member 14 is such that it may bear directly upon the supporting plug without the interposition of any metal wear resisting part being necessary.

One advantageous feature of the present construction is the location of the spring within the removable member so that it is spaced from the heater or resistance element and is located between the heater and the forepart of the removable member. The engagement of the heater 40 rim housing with an outwardly inclined contact 10 at substantially opposite locations is another advantageous feature.

I claim:

1. A cigar lighter comprising a stationary and 45 a removable element, the stationary element including an external tubular contact and an internal contact, the removable element including a knob having a wall slidable on the tubular contact, a conducting tube fixed within the knob and 50 movable therewith, a contact ring slidable on said tube and adapted to engage the tubular contact when the movable element is mounted on the stationary element, a spring interposed between the contact ring and a portion of the knob which 55 is stationary with respect to the tube, and a heater element mechanically supported by said tube and having one end electrically connected to the tube, the other end of said heater element constituting a contact ring adapted to engage the contact in 60 the stationary element.

2. A cigar lighter element comprising an insulating knob, a metal tube fixed in the knob, a contact ring slidable on said tube, a spring interposed between said ring and said knob, a heater 65 coil supported by said tube within said knob and having one end electrically connected to said tube, a second contact ring carried by said tube and surrounding and electrically connected to the outer end of said coil and adapted for engagement with 70 a stationary contact, said knob having a wall adapted to be slidably supported upon a stationary contact tube, said spring normally holding the circuit open and the second contact ring out of engagement with its cooperative stationary 75 contact.

3. A cigar lighter comprising a knob having a wall adapted to be slidably supported upon a stationary contact tube, a metal tube mounted within said knob and having external flanges embracing portions of said knob, a contact ring slidable upon said tube, a spring interposed between said ring and one of said flanges, a heater element mechanically supported by said tube beyond said ring and having one end electrically connected to said tube and a second contact ring coaxially carried by said tube end portion and electrically connected to the other end of said heater element, said spring normally holding the circuit open through said second contact ring by holding said knob and second ring away from a stationary contact member.

4. A cigar lighter element comprising an insulating knob having a central passage and having a wall adapted to be slidably mounted upon a stationary support, a metal tube fixed in said passage and having flanges interlocked with said knob, a contact ring slidable on said tube for electrically connecting said tube and said stationary support, spring means mounted on the tube and coating with said contact ring and knob 100 for normally holding the circuit open, a second contact ring carried by the inner end portion of said tube but insulated therefrom and adapted for cooperation with a stationary contact within said stationary support, and a heater coil having one end connected to the latter contact ring and the other end connected to said tube.

5. A cigar lighter, comprising a stationary element and a removable element, the stationary element consisting of a tubular outer contact and 110 an interior contact, the removable element comprising an insulating knob having a wall slidable upon the tubular outer contact, a tube having one end fixed in the knob, a contact ring slidable on said tube, a heater coil supported by said tube 115 and having one end electrically connected to said tube and a contact member for the other end of said coil adapted to engage the interior contact in the stationary element when the knob is moved inwardly on the tubular outer contact, said contact ring electrically connecting the tubular outer contact with said tube and the other end of said heater coil, a spring interposed between the stationary part of said knob and said contact ring, and an abutment on said tube for limiting the 125 movement of the contact ring with respect to the tube.

6. A cigar lighter comprising a stationary element and a removable element, the stationary element consisting of a tubular outer contact and 130 an interior contact, the removable element comprising an insulating knob telescoping over the tubular outer contact, a tube having at least one end fixed to the knob, a contact ring slidable on said tube, a heater coil supported by said tube 135 and having one end electrically connected to said tube, and a contact member for the other end of said coil adapted to engage the interior contact in the stationary element when the knob is moved inwardly on the tubular outer contact, said contact ring engaging and electrically connecting the tubular outer contact with said tube and the other end of said heater coil, a spring interposed between the stationary part of said knob and said contact ring, and an abutment fixed on said tube 145 for limiting the movement of the contact ring with respect to the tube, and another abutment intermediate the tube ends for engagement with said spring and formed of bent tube material.

7. A cigar lighter comprising a stationary ele-

ment and a removable element, the stationary element consisting of a tubular outer contact and an interior contact, the removable element comprising an insulating knob slidable upon the tubular outer contact, a tube having at least one end fixed to the knob, a contact ring slidable on said tube, a heater coil supported by said tube and having one end electrically connected to said tube, and a contact member for the other end of said coil adapted to engage the interior contact in the stationary element when the knob is moved inwardly on the tubular outer contact, 5 said contact ring engaging and electrically connecting the tubular outer contact with said tube and the other end of said heater coil, a spring interposed between the stationary part of said knob and said contact ring, and an abutment fixed on said tube for limiting the movement of the contact ring with respect to the tube, said last mentioned abutment including a bent metallic flange adjacent an end portion of said tube. 10

8. A cigar lighter comprising a stationary element and a removable element, the stationary element consisting of a tubular outer contact and an interior contact, the removable element comprising an insulating knob slidable upon the tubular outer contact, a tube having at least one end fixed to the knob, a contact ring slidable on said tube, a heater coil supported by said tube and having one end electrically connected to said tube, and a contact member for the other end of said coil adapted to engage the interior contact in the stationary element when the knob is moved inwardly on the tubular outer contact, 15 said contact ring engaging and electrically connecting the tubular outer contact with said tube and the other end of said heater coil, a spring interposed between the stationary part of said knob and said contact ring, and an abutment fixed on said tube for limiting the movement of the contact ring with respect to the tube, said last mentioned abutment including a bent metallic flange adjacent an end portion of said tube. 20

9. A cigar lighter comprising a stationary element and a removable element, the stationary element consisting of a tubular outer contact and an interior contact, the removable element comprising an insulating knob slidable upon the tubular outer contact, a tube having at least one end fixed to the knob, a contact ring slidable on said tube, a heater coil supported by said tube and having one end electrically connected to said tube, and a contact member for the other end of said coil adapted to engage the interior contact in the stationary element when the knob is moved inwardly on the tubular outer contact, 25 said contact ring engaging and electrically connecting the tubular outer contact with said tube and the other end of said heater coil, a spring interposed between the stationary part of said knob and said contact ring, and an abutment fixed on said tube for limiting the movement of the contact ring with respect to the tube, said tube being formed of two parts secured together and of different axial length, the shorter part of said tube being adjacent the heater coil and secured thereto by a fastening means passing centrally through the heater coil. 30

10. A cigar lighter comprising a stationary element and a removable element, the stationary element consisting of a tubular outer contact and an interior contact, the removable element comprising an insulating knob slidable upon the tubular outer contact, a tube having at least one end fixed to the knob, a contact ring slidable on said tube, a heater coil supported by said tube and having one end electrically connected to said tube, and a contact member for the other end of said coil adapted to engage the interior contact in the stationary element when the knob is moved inwardly on the tubular outer contact, 35 said contact ring engaging and electrically connecting the tubular outer contact with said tube and the other end of said heater coil, a spring interposed between the stationary part of said knob and said contact ring, and an abutment fixed on said tube for limiting the movement of the contact ring with respect to the tube, said tube being formed of two parts secured together and of different axial length, the shorter part of said tube being adjacent the heater coil and secured thereto by a fastening means passing centrally through the heater coil. 40

11. A cigar lighter comprising a socket member having a projecting metal tube constituting a circuit terminal with a spring finger projecting outward laterally therefrom and having an interior contact terminal insulated from the metal tube and a removable lighter member having an insulating knob slidable upon the outside of the metal tube and held frictionally in place by said spring finger, a metal sleeve having one end fixed within the knob, a metal ring slidable upon said sleeve and constituting a contact adapted to engage the outer end of the metal tube of the socket member, a spring surrounding the sleeve and interposed between a portion of the ring and a part of the sleeve so as to resiliently press the knob and sleeve outwardly away from the socket member, a resistance igniter carried by the rear end of the sleeve and having one end electrically connected to the sleeve and a contact carried by the rear end of the sleeve but electrically insulated therefrom and electrically connected to the other end of the igniter, said contact being adapted to engage the contact terminal within the socket member when the knob is pressed inwardly upon the metal tube and the spring has been compressed. 45

12. A lighter comprising a stationary element including a pair of contacts, a removable element slidably supported on one of said stationary contacts and including a pair of contacts, one of which normally engages the supporting contact of the stationary element and the second of which is adapted to engage the other stationary contact on sliding said removable element, said removable element also including a knob of insulating material, a tube fixed in the knob, a slideable contact ring on the tube shaped to engage and electrically connect said tube and the supporting contact of the stationary element, a spring between said ring and knob for normally holding said knob in position with its second contact disengaged from its cooperative stationary contact, a heater coil carried by said knob, said spring being adapted to be compressed against said ring and stationary supporting contact by sliding said knob toward the stationary contacts for closing the circuit between said normally open contacts. 50

13. In a cigar lighter of the type described, 55

the combination of a stationary unit having a hollow post and an insulated contact member within said hollow post, a hollow portable unit formed with an opening through its face wall, 5 a cylindrical supporting member mounted in said opening and having at its inner end a transverse wall and an annular abutment flange, a friction sleeve formed with a transverse wall slidably mounted on said supporting member and adapted 10 to telescopingly engage with said hollow post, a cup-shaped cooperating contact member mounted on said transverse wall, an igniter coil mounted in said last-named contact member, said transverse wall and the bottom wall of said cup-shaped contact member being apertured to permit light rays from said igniter coil to pass through said opening, and a coil spring encircling 15 said supporting member and confined endwise between the front wall of said portable unit and the transverse wall of said sleeve.

14. In a cigar lighter of the type described, the combination of a stationary unit having a hollow post and an insulated contact member within said hollow post, a hollow portable unit formed with an opening through its front wall, a cylindrical supporting member mounted in said opening and having adjacent its inner end a transverse wall and an annular abutment flange, a sleeve formed with a transverse flange slidably mounted on said supporting member and being adapted to telescopingly engage with said hollow post, a cup-shaped cooperating contact member mounted on said transverse wall, an igniter coil mounted in said last-named contact member, said transverse wall and the bottom wall of said cup-shaped contact member being apertured to permit light rays from said igniter coil to pass through said opening, and a coil spring encircling said supporting member and confined endwise between the front wall of said portable unit and the transverse flange of said sleeve.

15. In a cigar lighter of the type described, the combination of a stationary unit equipped with an insulated annular contact member, a hollow portable unit telescopingly engaged with said stationary unit and formed with an opening through its face wall, a cylindrical supporting member fixedly mounted in said opening, and having a transverse wall, a cup-shaped cooperating contact member mounted on said transverse wall, an igniter coil mounted in said last-named contact member, said transverse wall and the bottom wall of said cup-shaped contact member being apertured to permit light rays from said igniter coil to pass therethrough, and a spring normally maintaining said contact members separated.

16. A cigar lighter of the cordless type including socket and plug members, one of which is removable and the other stationary, a heater element carried by the removable member, electrical connections carried by each of said members for engagement with the connections of the other member, the removable member being normally carried by the stationary member in an open circuit position and being bodily movable with respect to the stationary member into a closed circuit position for supplying current to the heater element, a spring carried by said removable member and arranged for cooperation with said stationary member to bodily move said removable member to an open circuit position from a closed circuit position upon removal of pressure from the removable member, said spring being helical and co-axially arranged within the removable member and adapted to extend into the stationary member

and means extending radially between the spring and an end portion of the stationary member whereby the force of the spring may be applied to such end portion of the stationary member.

17. A cigar lighter of the cordless type including socket and plug members, one of which is removable and the other stationary, a heater element carried by the removable member, electrical connections carried by each of said members for engagement with the connections of the other member, the removable member being normally carried by the stationary member in an open circuit position and being bodily movable with respect to the stationary member into a closed circuit position for supplying current to the heater element, a spring carried by said removable member and arranged radially within at least a portion of said stationary member for cooperation therewith to bodily move said removable member to an open circuit position from a closed circuit position upon removal of pressure from the removable member and a contact ring and guide therefor within the removable member cooperating with said spring, said contact ring being movable with respect to the removable member when pressure is exerted upon the removable member in moving the same to a closed circuit position.

18. A cigar lighter of the cordless type including socket and plug members, one of which is removable and the other stationary, a heater element carried by the removable member, electrical connections carried by each of said members for engagement with the connections of the other member, the removable member being normally carried by the stationary member in an open circuit position and being bodily movable with respect to the stationary member into a closed circuit position for supplying current to the heater element, a spring carried by said removable member and arranged for cooperation with said stationary member to bodily move said removable member to an open circuit position from a closed circuit position upon removal of pressure from the removable member and a contact ring secured and guided within the removable member when said spring is compressed by pressure upon the removable member in moving the same to a closed circuit position, said contact ring having at least two circumferential bends for engagement between an end portion of the stationary member and said spring, and a supporting guide for said contact ring, said guide also supporting the heater and secured to the removable member.

19. A cigar lighter of the cordless type including socket and plug members, one of which is removable and the other stationary, a heater element carried by the removable member, electrical connections carried by each of said members for engagement with the connections of the other member, the removable member being normally carried by the stationary member in an open circuit position and being bodily movable with respect to the stationary member into a closed circuit position for supplying current to the heater element, a spring carried by said removable member and arranged for cooperation with said stationary member to bodily move said removable member to an open circuit position from a closed circuit position upon removal of pressure from the removable member, said removable member being of insulating material and having a conducting tube therein on which said heater is mounted adjacent the rear portion of the removable member, said spring being coiled about said tube, and

abutments on said tube for limiting the action of
said spring.

20. An igniter replacement assembly for cigar
lighters comprising two cup-like members facing
in opposite directions with their bases secured to-
gether but electrically insulated from each other,
one of said cup-like members constituting a ter-
minal flange and containing an igniting resistance
wire having one end electrically and mechanical-
ly connected thereto, the other end of the igniter
wire being electrically connected with the other
cup-like member, the latter cup-like member
being longitudinally longer than the former and
of smaller diameter and constituting a means for
attaching said unit to a supporting knob at a
distance from the resistance wire, and means
passing through the bases of said cup-like mem-
bers for clamping them together with an insu-
lating washer between them, said clamping means
being the electrical connection between the heater
and said unit supporting cup-like member. 80

21. A removable member for a cigar lighter
comprising a heater, a supporting handle portion
therefor insulated from the heater, a cup shaped
contact ring surrounding the heater, another
cup shaped conductor ring oppositely disposed to
the contact ring and insulated from and between
the handle and the contact ring, both of said
rings being radially within a surface of the re-
movable member which is adapted to slide along
the stationary member, and the conductor ring
constituting a sole support for the heater and
being removably secured to said removable mem-
ber on the inside thereof. 90

22. A removable member for a cigar lighter
comprising a heater, a supporting handle portion
therefor insulated from the heater, a contact ring
surrounding the heater, another contact ring in-
sulated from and between the handle and the first
mentioned contact ring, both of said rings being
radially within a surface of the removable mem-
ber which is adapted to slide along the stationary
member and said second ring being slidable with
respect to the heater in a direction longitudinally
of the removable member, and said second ring
being shaped for butt engagement with a portion
of a stationary member adapted to support the
removable member. 100

23. A cigar lighter of the cordless type includ-
ing socket and plug members, one of which is
a stationary hollow post and the other remov-
able, the removable member having a large por-
tion of its body comprised of insulating material
constituting the surface of the removable mem-
ber which is adapted to slide along the station-
ary member, said stationary member being of
metal, a heater element carried on the rear por-
tion of the removable member, electrical connec-
tions carried by each of said members for en-
gagement with the connections of the other mem-
ber, the removable member being normally car-
ried by the stationary member in an open circuit
position, at least the insulating portion of the re-
movable member being bodily movable along the
stationary member to a closed circuit position to
supply current to the heater element, a helical
spring coaxially carried by the removable mem-
ber between the heater and the front of the re-
movable member and remote from the heater, and
said spring being adapted to bodily move at least
the insulating portion of the removable member
and one of its electrical contacts from a position
in which the heater circuit is closed to a position
in which the circuit through the heating element
is open upon removal of pressure from the re-
movable member. 110

24. A cigar lighter of the cordless type includ-
ing socket and plug members, one of which is
a stationary hollow post and the other remov-
able, the removable member having a large portion
of its body comprised of insulating material con-
stituting the surface of the removable member
which is adapted to slide along the stationary
member, said stationary member being of metal,
a heater element carried by the removable mem-
ber, electrical connections carried by each of said
members for engagement with the connections
of the other member, the removable member be-
ing normally carried by the stationary member
in an open circuit position, at least the insulat-
ing portion of the removable member being bodily
movable along the stationary member to a closed
circuit position to supply current to the heater
element, a helical spring coaxially carried by the
removable member for cooperation with the sta-
tionary member and adapted to bodily move at
least the insulating portion of the removable
member and one of its electrical contacts from
a position in which the heater circuit is closed
to a position in which the circuit through the
heating element is open upon removal of pres-
sure from the removable member, said spring be-
ing longitudinally between the heater and a fore-
part of the removable member and longitudinal-
ly away from the heater zone, said spring being
also radially inside of the outer surface of the
stationary member and radially within the insu-
lating body part of the removable member, and
said spring being also longitudinally within the
insulating portion of the removable member and
adapted to be placed at least in part longitudinal-
ly intermediate the ends of the stationary mem-
ber. 120

25. A cigar lighter of the cordless type includ-
ing socket and plug members, one of which is
removable and the other a stationary hollow post,
a heater element carried by the rear portion of
the removable member, electrical connections car-
ried by each of said members for engagement
with the connections of the other member, the
removable member being normally carried by the
stationary member in an open circuit position
and being bodily movable with respect to the sta-
tionary member into a closed circuit position for
supplying current to the heater element, a spring
carried by said removable member and arranged
for cooperation with said stationary member to
bodily move said removable member to an open
circuit position from a closed circuit position upon
removal of pressure from the removable mem-
ber, said spring being helical and co-axially ar-
ranged within the removable member between the
heater and a forepart of the removable member
and away from the heater, said spring being also
radially inside the surfaces of the plug and socket
members along which one slides with respect to
the other. 130

26. A cigar lighter of the cordless type includ-
ing socket and plug members, one of which is
removable and the other a stationary hollow post,
a heater element carried by the removable mem-
ber, electrical connections carried by each of said
members for engagement with the connections of
the other member, the removable member being
normally carried by the stationary member in
an open circuit position and being at least in part
bodily movable with respect to the stationary
member into a closed circuit position for supply- 140

145

150

ing current to the heater element, a spring carried by said removable member and arranged for cooperation with said stationary member to bodily move at least a substantial part of said removable member to an open circuit position from a closed circuit position upon removal of pressure from the removable member, said spring being helical and coaxially arranged within the remov-

able member, said spring being also radially inside the surfaces of the plug and socket members along which one slides with respect to the other, and said spring being also contiguous neither of said sliding surfaces but being carried substantially contiguous an inner and coaxial surface and spaced from the heater. 80

SIDNEY L. WOLFSON.

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Nov. 17, 1936.

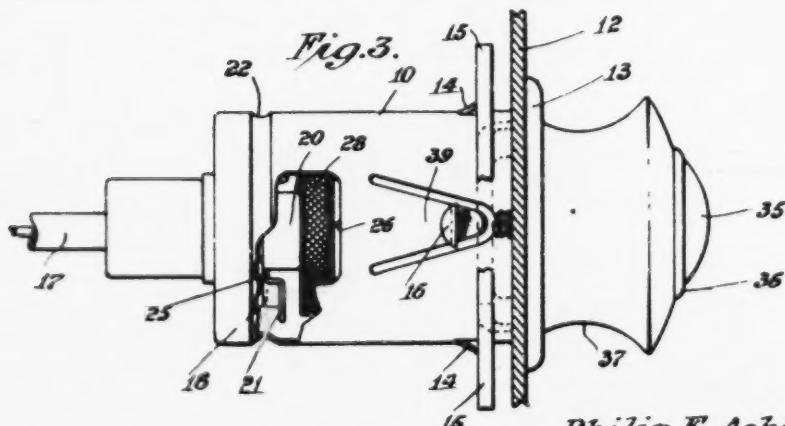
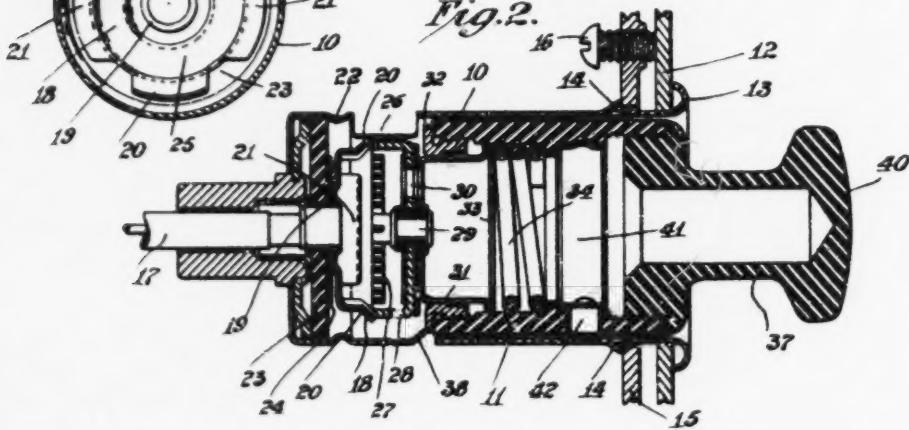
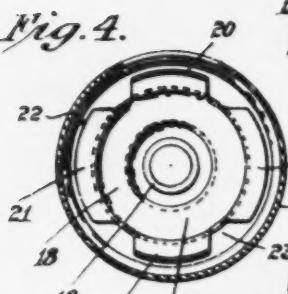
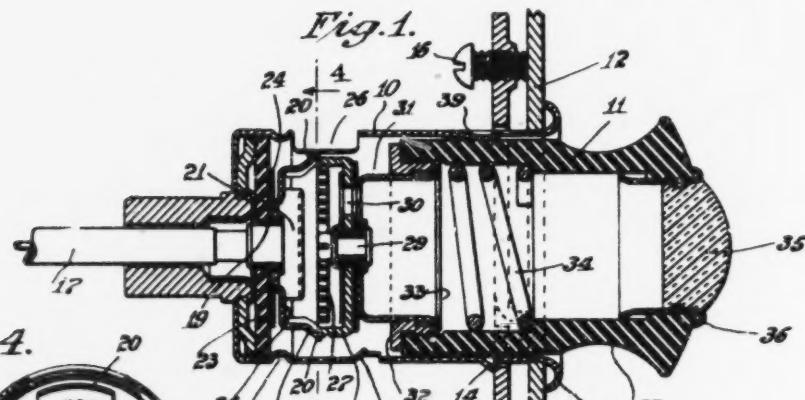
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2,060,783

CIGAR LIGHTER

Filed Oct. 8, 1934

2 Sheets-Sheet 1



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2,060,783

CIGAR LIGHTER

Filed Oct. 8, 1934

2 Sheets-Sheet 2

Fig. 5.

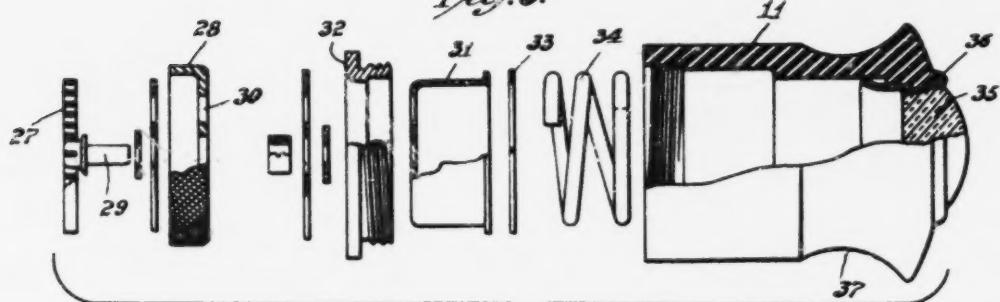


Fig. 6.

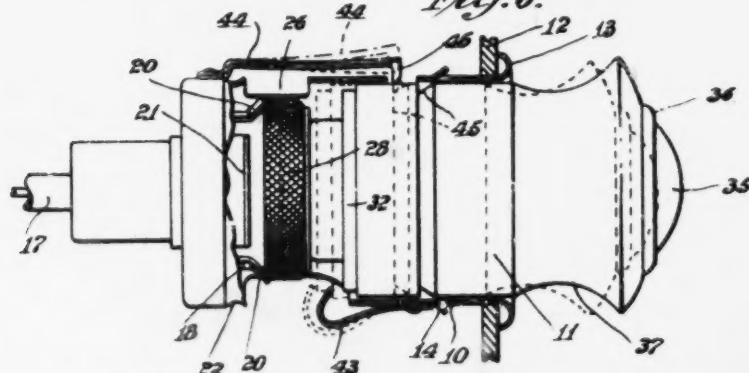


Fig. 9.

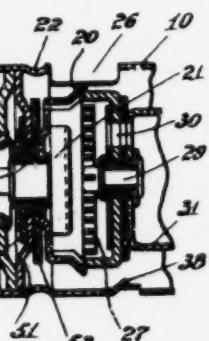
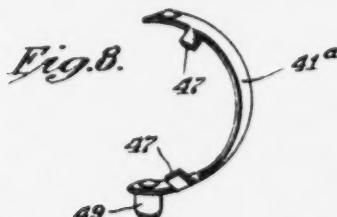
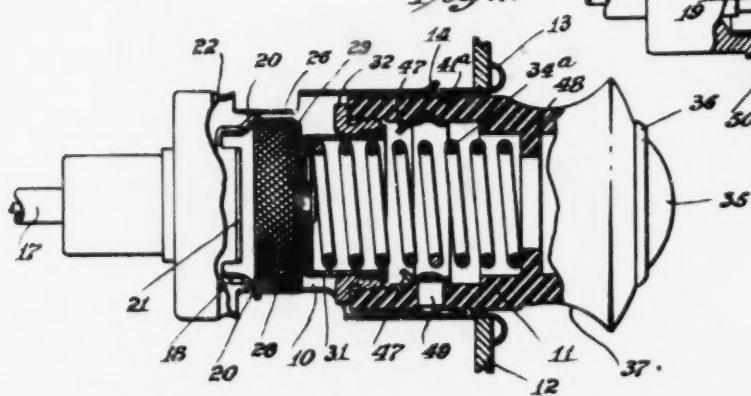


Fig. 7.



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INVENTOR

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2,060,783

UNITED STATES PATENT OFFICE

2,060,783

CIGAR LIGHTER

Philip E. Ashton, Meriden, Conn., assignor to The Cuno Engineering Corporation, Meriden, Conn., a corporation of Connecticut

Application October 8, 1934, Serial No. 747,377

18 Claims. (Cl. 219—32)

This invention relates to electric cigar lighters, especially those of the cordless type, and has for its object to provide a simple and inexpensive device of this class having few parts.

Another object is to provide such a device in which the spring for opening the heater circuit is carried by the removable member in a manner to be protected from the heater.

A further object is to provide a simple thermostatic control for such a device, which is adapted to open the circuit and permit at least a substantial part of the removable member to slide longitudinally of the stationary mounting member.

Referring to the drawings.

Fig. 1 is a longitudinal section through one embodiment of this invention with the circuit open.

Fig. 2 is another longitudinal section through a slightly modified construction showing the circuit closed.

Fig. 3 is a top plan view of the device of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is an exploded view showing the parts comprising the removable member.

Fig. 6 is a longitudinal view partly in section showing the device of this invention controlled by a thermostat.

Fig. 7 is a longitudinal section of another modification of this invention.

Fig. 8 shows the arcuate spring used in Fig. 7.

Fig. 9 shows a preferred construction for mounting the center contact in the socket without the use of the large washer of insulating material.

The stationary socket member 10 carries the plug 11 which is largely of insulating material. The socket is secured to the dashboard 12 of an automobile or elsewhere in any convenient manner such for example as by providing the socket with a front flange 13 adapted to engage the front of the panel 12 and any convenient means for clamping the front flange against the panel. For purposes of illustration this securing means comprises a plate 15 which is contiguous a plurality of abutments 14 formed by stamped out lugs integral with the metal socket, such abutments 14 being preferably two or three in number and being substantially equi-distantly spaced angularly.

As shown in my copending application Serial Number 747,376 filed October 8th, 1934, the plate 15 has preferably three lugs engaging the rear of the panel 12, at least one of these lugs being adjustable and the adjustable lug is shown as being constituted by the screw 16 so that on tightening the screw the socket is held with its front flange clamped against the front of the panel 12.

Some convenient and customary form of central contact is mounted within the base of the socket supplied with current through the insulated conductor 17 to a rivet 18 which holds the center con-

tact 19 in position. Unlike the usual center contacts the one of this invention is shown in Fig. 4 as being comprised of two opposite prongs 20 which are slightly yieldable and engage the outer edge of the resistance element housing ring. There are also provided a pair of oppositely spaced contact prongs 21 which are less yieldable than those numbered 20, the latter being substantially rigid.

Some convenient means may be provided for positioning the center contact within the socket, such as the stamped bead 22 which engages the insulating disc 23 to hold the same within the socket base. The disc 23 is preferably of "phenolite" or other appropriate electrical and thermal insulating material. The center contact 19 is secured to the insulating disc 23 and thereby centrally positioned in the socket.

The center contact is substantially dished as is customary but instead of the base of this center contact 19 being all of it contiguous the insulating disc 23, it has been found desirable to have the base of this center contact 19 stepped as illustrated in Figs. 1 and 2 so that only a small central portion of the base is contiguous the insulating disc while a substantial portion 25 of the bottom is stepped or offset from the insulating disc in order to provide space for the passage of cooling currents of air which pass substantially transversely through the large perforations 26 in the socket around the heater and center contact. A mica washer 24 has been mounted between the insulating disc 23 and the center contact 19, as such has been found desirable where the insulating disc 23 may not be a good thermal insulator.

There are preferably two or three or more large size perforations 26 to allow the air currents to enter and pass through and around the socket for cooling purposes.

Some usual type of resistance element 27 is provided in spiral form one end of which is preferably welded to the rim of the housing 28. The other end of the heating coil 27 is secured in the rivet 29 by clamping or in some other usual manner. The rivet 29 carries the current to the heater supporting tube 31 and as illustrated the housing 28 is insulated from the rivet and tube 31 by the insulating washers and the central bushing, as is usual.

Where desired the insulating washers and the vertical wall of the housing 28 may be provided with perforations 32 of a substantially large angular extent to provide better ventilation where the body of the plug may be perforated or to allow the transmission of any light desired from the heater when it has become hot enough to glow.

The supporting tube or annular member 31 is made slidable within the contact ring or annular

or tubular member 32 and this latter ring is illustrated as being threaded to the inside of the insulating material constituting the main body portion of the plug or tubular member 11. Where 5 the outer surface of the housing rim 28 is knurled as shown in Figs. 3 and 5 for example to facilitate unscrewing the heater supporting tube 31 and the ring 32 from the body of insulating material, it will be understood that the tube 31 is preferably 10 splined to the ring 32 by means of a stamped longitudinal rib and recess, in order to prevent the tube 31 from turning within the contact ring 32 yet permitting the one to shift longitudinally with respect to the other.

15 Within the plug is shown a coaxial helical spring 34 cooperating at one end with a shoulder formed in the tubular body member of insulating material and at its other end with the enlarged rim or radial flange on the tube 31 so 20 that the spring 34 normally tends to push the heater and its support 31 away from the handle end of the plug.

To electrically and thermally insulate the spring 34 from the supporting tube 31 a mica washer 33 25 is preferably placed around the end of the tube 31 in order to prevent the transfer of any dangerous amount of heat to the spring 34.

In accordance with the usual practice the front of the bore through the plug may be closed 30 by an ornamental piece of colored glass 35 which may also be translucent. This glass 35 is held in place by a ferrule 36 of the one piece construction illustrated or of the two piece construction as 35 shown by my copending application previously referred to. The usual finger groove 37 is provided to assist in holding the removable plug member.

For closing the circuit the socket 18 is provided with inwardly bent lugs or abutment contacts 38 40 adapted to engage the surface of the contact ring 32 which is toward the heater.

In operation the device of Fig. 1 is normally held in the open circuit position illustrated with the heater cup 28 in contact with the central 45 socket contact 18. On pushing in the main body portion of the plug against the action of the spring 34 the spring is compressed and the contact ring 32 slides along the socket member until it engages the abutment contacts 38 to close the circuit through the heater element.

Upon removal of the pressure the spring pushes the main body portion of the plug away from the abutment contacts to open the circuit, should the plug not be pulled out for lighting a cigar or cigarette. There are preferably two or three or more 55 abutment lugs 38 which contact with the ring 32 in closing the circuit.

In compressing the spring and moving the main body of the plug inwardly the yieldable portions 28 of the center contact may allow limited movement of the heater element until the non-yieldable portions 21 are engaged. It is not necessary that any portion of the center contact 18 be yieldable in the device illustrated in Fig. 1 60 and the heater may be held normally in engagement with the center contact by some convenient type of friction device between the plug and socket.

While any well known construction for such 70 friction device common in socket devices in any art may be used, nevertheless in Fig. 3 has been shown an improved type of heat friction tongue which is adapted to engage the surface of the plug and hold the plug within the socket. The ordinary friction tongues having parallel sides

have not been found to be stiff enough without the expense of reenforcing because the maximum bending moment and practically the entire bending movement occurs at the base of such a tongue.

In Fig. 3 has been shown a construction providing a stiffer and more serviceable friction device comprised of a tongue 38 whose sides diverge away from the tip so that the base of the tongue is wider and of more metal than any other portion and therefore the bending necessary in the tongue 38 will not be localized at the base but will be distributed throughout the tongue.

Another factor contributing to the greater serviceability of the friction device illustrated in Fig. 3 is due to the fact that the socket 18 is rounded and therefore the base of the tongue is arcuate in cross section which is equivalent to thickening the tongue a greater amount at the base than at the tip and due to the curvature 20 of the tongue this equivalent thickness so far as bending occurs is reduced toward the tip since the angular extent of the tongue circumferentially of the socket is gradually less toward the tip of the tongue. As shown in Fig. 1 the tip of 25 the tongue 38 is slightly turned up as well as being bent down to smoothly engage the plug surface and avoid catching on the rear edge of the plug.

In Fig. 2 the construction is the same as that 30 in Fig. 1 except in regard to the type of friction device used and in regard to the shape of the finger gripping portion of the plug. Instead of having the finger gripping channel 37 of the shape illustrated in Fig. 1, it will be seen that in 35 Fig. 2 this channel is deeper and is formed in a separate piece of insulating material 40 which is screwed on to the main body insulating portion of the plug.

The separate handle portion 40 may also be 40 of metal if desired, or of some one of the numerous translucent or opaque insulating materials. As shown and described in my aforementioned application, an arcuate spring 41 normally presses a button 42 into engagement with the 45 socket 18 for frictionally retaining the plug in position. The rest of the plug is the same as that shown in Fig. 1, as is also the socket, the only difference being that the plug is shown in a circuit closing position in Fig. 2 with the contact ring 32 in engagement with the ground abutments 38. It will be understood that instead of the friction means 42, some other form of commonly used friction device from any art may be substituted.

It is thought the exploded view of Fig. 5 needs no additional description in view of the foregoing remarks.

In Fig. 6 the plug and socket members are similar to those in either Figs. 1 or 2 with the addition of a thermostatically controlled latch 44 on the socket member for engagement with a peripheral groove 45 in the plug member when the plug is in a closed circuit position with the contact ring 32 engaging a slightly yieldable ground 65 abutment 43 instead of the somewhat rigid abutments 38. On pushing in the plug to a closed circuit position the ring 32 engages the ground connection 43, the closed circuit position being as shown in dotted lines in Fig. 6.

The thermostatic latch 44 of bimetallic strip material is secured at the rear end of the socket by a rivet or in other convenient manner and is so shaped as to normally tend to slip into the groove 45 under its own resiliency. The socket 75

18 being provided with the large perforations 28 makes it possible for the air heated by the resistance element 27 to rise through the socket upper wall and come in contact with the thermostatic element 44. As this strip is heated to a predetermined amount it then snaps out of the groove 45, allowing the hook end of the latch to be released from engagement with the plug whereby the spring 34 in the plug pushes the main body portion of the plug outwardly opening the circuit between the ground contact 43 and the ring 32. An advantage of such a thermostat control is the elimination of the necessity for the operator holding the plug member pressed in during the time the resistance element is heating up.

While this time is relatively short, nevertheless the use of the thermostat control also gives uniformity in heating and makes it possible for an operator to get the same degree of heat in the plug each time it is pulled out, where the operator waits until the thermostatic latch opens the circuit before withdrawing the plug.

There is enough snap action resulting from the opening of the thermostatic latch to constitute a visual and audible signal that the plug is ready to be withdrawn for lighting, the audible signal being due to the release and snap movement of the latch and plug and the visual signal being due to the outward movement of the main body portion of the plug rather than to the transfer of any light from the incandescent heater through the fairly long body of the plug, in daylight and where as usual the driver or operator sits to one side of the cigar lighter.

In Fig. 7 is shown a slightly modified construction in which the spring 34a is considerably longer and connects the inner end of the supporting tubular member 31 at one end and an abutment 48 in the tubular member 11 at the other end of the spring. Where the spring would otherwise be in contact with the tubular metal ring 31, it is desirable to provide an insulating washer of mica or other insulating material to prevent heat transfer to the spring 34a. In this embodiment the ground abutments of Figs. 1, 2 and 6 have been eliminated and instead the ground contact is formed through a metal button 49 which is pressed by the arcuate spring 41a into engagement with the socket member for frictionally retaining the plug within the socket.

On pushing the plug member inward the inner end portion of the supporting ring 31 contacts with the side of the arcuate spring 41a to close the circuit. Instead of having the ring 31 engage the spring 41a on its thin edge where the same is fairly rigid, it will be found more desirable to provide small inwardly bent portions 47 on the spring 41a, which portions constitute slightly yieldable abutments for engagement with the end of the supporting tube 31.

These slightly yieldable portions are shown also in Fig. 8.

In Fig. 9 is shown a simple and preferred construction embodying the mounting of the center contact 18 without the use of a large insulating washer 23. From the drawings it will be seen that the mica washer 50 is located within the dished or cupped portion of the steel washer 51 to insulate the lighting terminal from the socket member. The mica washer 52 on the front of the steel washer 51 also insulates the center contact from the steel washer and socket on the front side. The steel washer is held in position

in the socket by the bead 22 as is the insulating washer in Figs. 1 and 2.

When the heater is left in a circuit closed or on position there is danger of the "phenolite" washer 23 being affected by the heat and for this reason the construction of Fig. 9 is preferred for all of the foregoing modifications including the thermostatically controlled construction.

The main body portion of the plug may be of a phenolic condensation product or other suitable insulating material.

The large perforations 28 in the socket are at least two in number and preferably located on diametrically opposite sides, namely the top and bottom of the socket where convenient, in order to allow cooling currents of air to be passed substantially transversely through the socket, although when this is not convenient, the number of such large perforations 28 may be increased to three or more.

The contact ring 32 is preferably located radially inward from the surface of the plug so as to be well out of contact with the socket when the main body portion of the plug is in an off position with the circuit open. This contact ring 32 and the heater supporting tube 31 need not necessarily be splined, especially where the flange of the ring 32 which contacts with the ground abutments 38 is made thick enough or wide enough longitudinally to permit of having the periphery of this flange knurled instead of that of the heater housing.

The groove 45 in the plug is preferably provided with a metal wear resisting ring in its vertical wall which is engaged by the hook 48 of the thermostatic latch 44. It will be understood that when the spring pushes the main body portion of the plug outwardly to an open circuit position that the heater preferably remains in contact with the center terminal 18 of the socket.

The construction shown in Fig. 9 is of advantage in providing good dissipation of heat transferred to the center contact 18 from the heater.

From Figs. 1 and 7 it will be apparent that when the circuit is closed the helical spring will not be fully compressed, with the result that no greater than spring pressure is ever placed upon the central contacts 28.

I claim:

1. A cigar lighter comprising a stationary member, a removable member, a heater on the removable member, said stationary member comprising a metal tube having a contact therein insulated from the tube and mounted on a washer, said contact being dished toward the heater to receive the heater rim within at least a portion of its outwardly inclined edges, a rivet securing said contact to said washer on which it is mounted, the bottom of said contact being stepped to space a substantial part of the bottom of said contact from the washer to allow cooling air currents to pass between the washer and spaced part of the bottom of said contacts, said tube being provided with perforations to allow the passage of air currents through the tube and around said contact.

2. A cigar lighter comprising a stationary member, a removable member, a heater on the removable member, said stationary member comprising a metal tube having a contact therein insulated from the tube and mounted on a washer, said contact being dished toward the heater to receive the heater rim within at least a portion of its outwardly inclined edges, a rivet securing

said contact to said washer on which it is mounted, the bottom of said contact being stepped to space a substantial part of the bottom of said contact from the washer to allow cooling currents 5 of air to pass between the washer and spaced part of the bottom of said contact, said tube being provided with perforations to allow the passage of air currents through the tube and around said contact, the edge portion of said contact being 10 notched to provide spaced pairs of contacting portions, one of said pairs being at least slightly yieldable and the other of said pairs being less yieldable.

3. A cigar lighter comprising socket and plug members, one of which is stationary and the other removable, a heater on the removable member, means for frictionally maintaining the plug and socket members engaged, at least one of said members being of metal, said friction means comprising a tongue stamped out of the metal member for cooperation with the surface of the other member along which said relative movement between the members occurs, and the sides of said tongue diverging from its tip to stiffen the tongue, 25 and the surface of the metal member containing the tongue being rounded whereby at least the base of the tongue is also rounded and is of greater angular extent than its tip to additionally stiffen the tongue.

30 4. A cigar lighter comprising a socket and removable plug, said socket having a pair of contacts, one in the base and the other located intermediate the base and the outer end of the socket, said plug including a handle portion and a heater unit, said heater unit including a circular contact member engaging the base contact of the socket and surrounding a heated member which is adapted to be brought to incandescence, longitudinally extending walls attached to said contact member and projecting on the side thereof opposite said heated member, a ring slidable on said longitudinally extending walls, said ring being adapted for engagement with the intermediate socket contact, a spring within said plug cooperating with the body of the plug and with said longitudinally extending walls, a friction device for holding the plug within the socket, the circuit through said heated member being closed on distortion of the spring due to the plug being moved 40 inwardly, with the contact member held against movement by the base contact of the socket, for engagement between said ring and intermediate socket contact.

5. A cigar lighter comprising a socket and removable plug, said socket having a pair of contacts, one in the base and the other located intermediate the base and the outer end of the socket, said plug including a handle portion and a heater unit, said heater unit including a contact member engaging the base contact of the socket and surrounding a heated member which is adapted to be brought to incandescence, longitudinally extending walls attached to said contact member and projecting on the side thereof opposite said heated member, a ring slidable on said longitudinally extending walls, said ring being adapted for engagement with the intermediate socket contact, a spring within said plug cooperating with the body of the plug and with said longitudinally extending walls, the circuit through the heated member being closed by engagement between said ring and intermediate socket contact in advance of full distortion of said spring so 70 that no more than the pressure due to said spring

may ever be applied to the base contact of the socket.

6. A cigar lighter comprising a socket and removable plug member, said socket having a contact in the base and another projecting radially inward intermediate the base and front end of the socket, said plug including a body of insulating material, a handle portion and a heater unit, said heater unit having a contact member for engagement with the base contact of said socket, a heated member adapted to be brought to incandescence within said contact member, an annular member secured to the insulating body of said plug another annular member slidable within the first mentioned annular member, clamping means 15 extending through said contact member and at least one of said annular members for securing them together, one of said annular members being adapted to engage the intermediate socket contact, and a spring between said annular members adapted to normally maintain the circuit through the heated member open and at least one of the socket contacts disengaged from its cooperative plug contact, the circuit through said heated member being closed on inward movement 20 of the plug within the socket and distortion of said spring held against the plug contact member engaging the base contact of the socket and the annular member engaging said intermediate socket contact.

7. As an article of manufacture a removable plug member, adapted to be inserted and supported in a socket having a contact in the base and another projecting inward intermediate the base and front end of the socket, said plug including a body of insulating material, a handle portion and a heater unit, said heater unit having a cup-shaped member for engagement with the base contact of said socket, a resistance wire adapted to be brought to incandescence within 30 said cup-shaped member, an annular member secured to the insulating body of said plug, another annular member slidable within the first mentioned annular member, clamping means extending through said cup-shaped member and at least 35 one of said annular members for securing them together, one of said annular members being adapted to engage the intermediate socket contact, and a spring between said annular members adapted to normally maintain the circuit through 40 the resistance wire open and at least one of the socket contacts disengaged from its cooperative plug contact, the circuit through said resistance wire being closed on inward movement of the plug within the socket and distortion of said 45 spring held indirectly against one of the socket contacts, and one of said annular members being provided with a longitudinal rib for engagement with the other annular member.

8. A plug member for a cigar lighter adapted 50 to be inserted in a socket having a contact in the base and another projecting inward intermediate the base and front end of the socket, said plug including a body of insulating material, a handle portion and a heater unit, said heater unit 55 having a circular contact member for engagement with the base contact of said socket, a heated member adapted to be brought to incandescence within said contact member, an annular member secured to the insulating body of said plug, another annular member slidable within the first mentioned annular member, clamping means extending through said contact member and at least one of said annular members for securing them 60 together, one of said annular members being 65

adapted to engage the intermediate socket contact, and a spring between said annular members adapted to normally maintain the circuit through the heated member open and the projecting socket contact disengaged from its cooperative plug contact, the circuit through said heated member being closed on inward movement of the plug within the socket and distortion of said spring held indirectly against one of the socket contacts, said spring being electrically and thermally insulated at each of its ends from all other electrically conductive and heated elements.

9. A cigar lighter plug member adapted to be inserted in a socket having a contact in the base and another projecting inward intermediate the base and front end of the socket, said plug including a body of insulating material, a handle portion and a heater unit, said heater unit having a circular contact member for engagement with the base contact of said socket, a heated member adapted to be brought to incandescence within said contact member, an annular member secured to the insulating body of said plug, another annular member slidable within the first mentioned annular member, clamping means extending through said contact member and at least one of said annular members for securing them together, one of said annular members being adapted to engage the intermediate socket contact, and a spring between said annular members adapted to normally maintain the circuit through the heated member open and at least one of the socket contacts disengaged from its cooperative plug contact, the circuit through said heated member being closed on inward movement of the plug within the socket and distortion of said spring held indirectly against one of the socket contacts, one of said annular members being provided with a longitudinal rib for engagement with the other annular member whereby both of said socket contacts are adapted to be cleaned by relative rotation between said plug and socket.

10. A cigar lighter comprising a socket and removable plug member, said socket having a contact in the base and another projecting radially inward intermediate the base and front end of the socket, said plug including a body of insulating material, a handle portion and a heater unit, said heater unit having a cup-shaped member for engagement with the base contact of said socket, a coil of resistance wire adapted to be brought to incandescence within said cup-shaped member, an annular member secured to the insulating body of said plug, another annular member slidable within the first mentioned annular member, clamping means extending through said cup-shaped member and at least one of said annular members for securing them together, one of said annular members being adapted to engage the intermediate socket contact, and a spring between said annular members adapted to normally maintain the circuit through the resistance wire open and at least one of the socket contacts disengaged from its cooperative plug contact, the circuit through said resistance wire being closed on inward movement of the plug within the socket and distortion of said spring against one of the socket contacts, the base contact of the socket being at least slightly yieldable and the intermediate socket contact being substantially rigid and shaped for butt engagement with an annular member of the plug.

11. A cigar lighter comprising a stationary member and a removable member having an insulating body, a pair of contacts in said station-

ary member, one in the base and the other intermediate the base and the outer end thereof, said removable member being slidable along the stationary member and having a pair of contacts in rear of the insulating body of said removable member and radially inward of the outer surface of said insulating body and adapted for engagement with said contacts in the stationary member, a spring within said removable member adapted to be distorted when the removable member is moved inwardly along said stationary member to close the circuit through a heater carried by the removable member, said spring being adapted on release of pressure holding said removable member to slide the body of the removable member outwardly and separate the intermediate contact of the stationary member from its cooperative contact on the removable member by spring pressure exerted through the contact of the removable member which cooperates with the contact in the base of the stationary member as an abutment.

12. A cigar lighter comprising a stationary member, a removable member, a pair of contacts in said stationary member, one in the base and the other intermediate the base and the outer end of the stationary member, said removable member being adapted to be slid along said stationary member to close a circuit through a pair of contacts carried by the removable member at the rear end portion thereof, one of said removable member contacts being at its inner end portion, an annular member secured to the body of said removable member, another annular member slidable within the first annular member, one of said annular members constituting another contact for said removable member and being adapted for engagement with the intermediate contact of said stationary member, clamping means passing through said end contact member and the second mentioned annular member for securing said end contact member and both of said annular members together as a unit, a spring between said annular members adapted to be distorted when said removable member is moved along the stationary member by engagement between a contact of the removable member and one of the contacts of the stationary member as an abutment, a heated member carried within the end contact member, the spring being adapted on release of pressure upon the removable member to slide said removable member forwardly and separate the contact of the stationary member which does not act as an abutment from its cooperative contact on the removable member.

13. A cigar lighter plug member adapted to be inserted in a socket having contacts, one in the base of the socket, said plug including a body of insulating material, a handle, and a heater unit on the rear end portion of the plug for cooperation with the socket contacts, contacts carried by said plug and a combined friction device and current conductor carried by the plug holding the plug in engagement with at least one of the socket contacts, said friction device including a spring within the body of the plug and a button extending through the body of the plug and pressed outward by the spring into cooperation with the inner surface of the socket.

14. A heating unit for a cigar lighter comprising a circular contact member, a heated member supported therein, a tubular member substantially coaxially secured to said circular contact member and extending longitudinally on the side thereof opposite to the heated member, a

radial flange on said tubular member, another tubular member slidable with respect to the first mentioned tubular member at least in part between said radial flange and said circular contact member with the body portions of both tubular members substantially contiguous one another to provide a guiding surface for their relative movement, a radial contact flange on the second mentioned tubular member, axial securing means for holding the first mentioned tubular member to said circular contact member, the outer surface of the body portion of the outer one of said tubular members being provided with screw threads for attaching the unit to a support.

15 15. A heating unit for a cigar lighter comprising a circular contact member, a heated member supported therein, a tubular member substantially coaxially secured to said circular contact member and extending longitudinally on the side thereof opposite to the heated member, a radial flange on said tubular member, another tubular member slidable with respect to the first mentioned tubular member at least in part between said radial flange and said circular contact member with the body portions of both tubular members substantially contiguous one another to provide a guiding surface for their relative movement, a radial contact flange on the second mentioned tubular member, axial securing means for holding the first mentioned tubular member to said circular contact member, and a spring within said tubular members tending to move the second mentioned tubular member toward one position of its relative travel with respect to the first mentioned tubular member.

16. A cigar lighter comprising a removable plug, for insertion in a socket having a contact in the base insulated therefrom and another contact constituted by a portion of the socket forward of the base, said plug having an insulating body portion with a handle on the forward part and a heater unit carried at the rear of said body portion, said heater unit including a contact member for engaging the base contact of the socket and surrounding a heated member which is adapted to be brought to incandescence, a conducting member secured to but insulated from said contact member and extending forwardly thereof, a combined friction means and contact for holding the plug within the socket and for carrying current between the socket and said conducting member and including a metal plunger radially extending through a wall of the insulating plug body, spring means urging said plunger radially outward, a contact connected with said plunger and another contact slidably with said conducting member and heating unit relatively to the plug body, a spring cooperating between said contacts to maintain them longitudinally spaced apart and the plug body in an open circuit position, said spring being strong enough so that upon release of the plug body when the spring is compressed the spring is capable of sliding the plug body against the action of said friction and spring means, said spring being biased between the contact member and the insulating body portion of said plug for sliding the insulating plug body forwardly to an open circuit position.

17. A cigar lighter comprising a removable plug for insertion in a socket having a base contact and another contact forward of the base, said plug having an insulating body portion with a handle

at the forward part and a heated unit carried at the rear of said body portion and slidably relatively thereto, a conducting member fixed to said unit and extending forwardly thereof into the body of said plug, a switch contact part carried by said conducting member for movement within the plug body, a cooperative switch contact part within said plug constituted by a conductor curved transversely of the plug, the plug body being hollow to receive said switch parts, a radial plunger extending through a wall of said plug body, mounted on said transversely curved conductor and biased outwardly whereby said plunger may function as a friction device for retaining the plug within the socket and also as a current conductor between said transversely curved switch part and the forward socket contact, a spring carried by the plug body for normally maintaining said switch contacts separated, said heated unit being normally maintained in mechanical and electrical contact with the contact in the base of the socket, said spring being strong enough when compressed by inward movement of the plug body and handle in closing a circuit through the heated member to slide the insulated plug body outwardly against the action of said friction device upon release of said spring to open the heated member circuit, said friction device being sufficient to normally maintain the plug body in the socket with the heated member substantially contiguous the base contact of the socket when the socket and plug are substantially horizontal.

18. A cigar lighter comprising a socket and removable plug, said socket having a contact in the base insulated therefrom and another contact constituted by a portion of the socket forward of the base, said plug having an insulating body portion with a handle on the forward part and a heater unit carried at the rear of said body portion, said heater unit including a contact member for engaging the base contact of the socket and surrounding a heated member which is adapted to be brought to incandescence, a longitudinally extending tubular member attached to the contact member and projecting forwardly on the side thereof opposite said heated member, said tubular member being slidably with respect to the body portion of said plug, said tubular member and plug body being provided with means to prevent relative rotation between said plug and contact member whereby on rotation of the plug the contact member may be rotated relatively to the base contact of the socket for cleaning the electrical contact between said contact member and the base contact of the socket, another contact member carried by the plug and adapted to electrically engage the socket and means for frictionally holding the plug within the socket, a spring carried by the plug and adapted to normally maintain a circuit for the heated member open, said spring being compressible on inward movement of the insulating body portion of the plug to close a circuit for said heated member and said spring cooperating with the body portion of said plug and with the base contact of the socket as an abutment whereby on release of the spring when compressed it is strong enough to bodily slide the insulating body portion of the plug against the action of said friction means to an open circuit position for said plug.

DISCLAIMER

2,060,783.—*Philip E. Ashton*, Meriden, Conn. CIGAR LIGHTER. Patent dated November 17, 1936. Disclaimer filed September 3, 1940, by the assignee, *The Cuno Engineering Corporation*.

Hereby enters this disclaimer to claims 6, 12, 13, 14, 15, 16, and 18 of said Letters Patent.

[*Official Gazette October 8, 1940.*]

June 22, 1937.

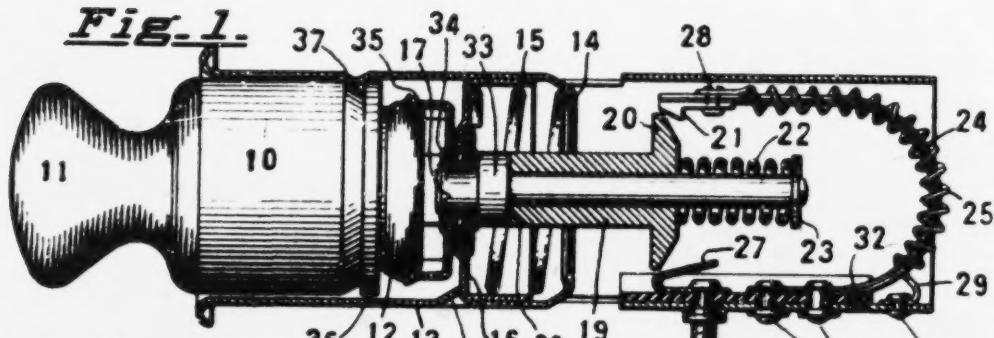
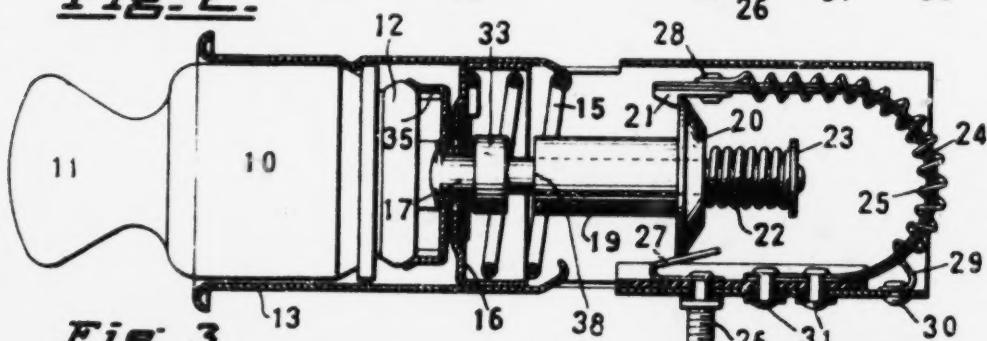
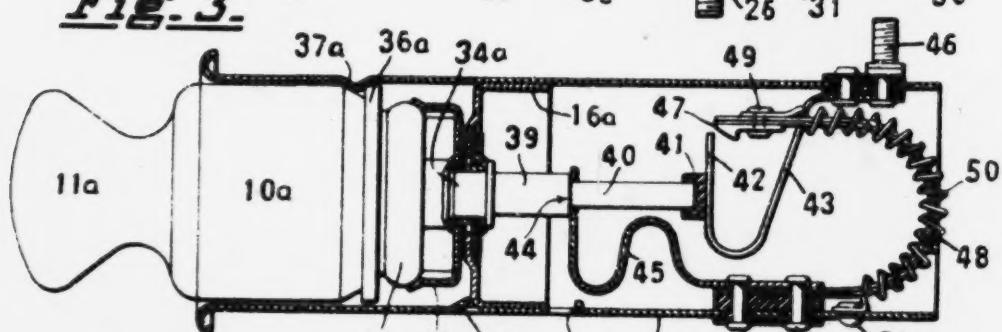
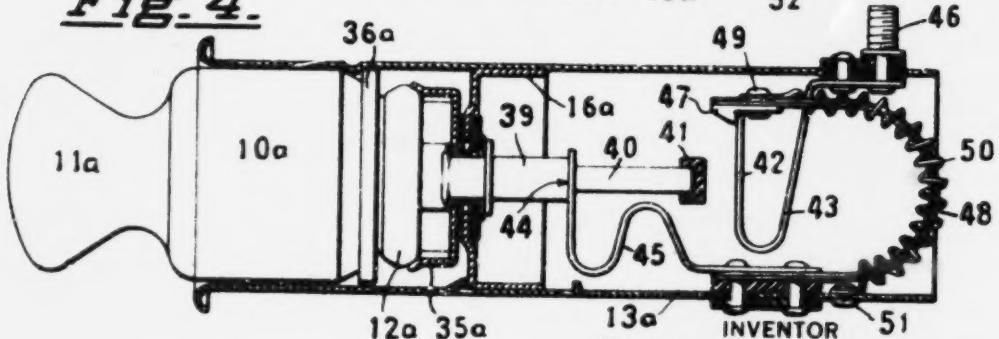
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2,084,966

ELECTRIC HEATER

Filed March 25, 1936

2 Sheets-Sheet 1

Fig. 1.Fig. 2.Fig. 3.Fig. 4.INVENTOR
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2 Sheets-Sheet 2

Fig. 5.

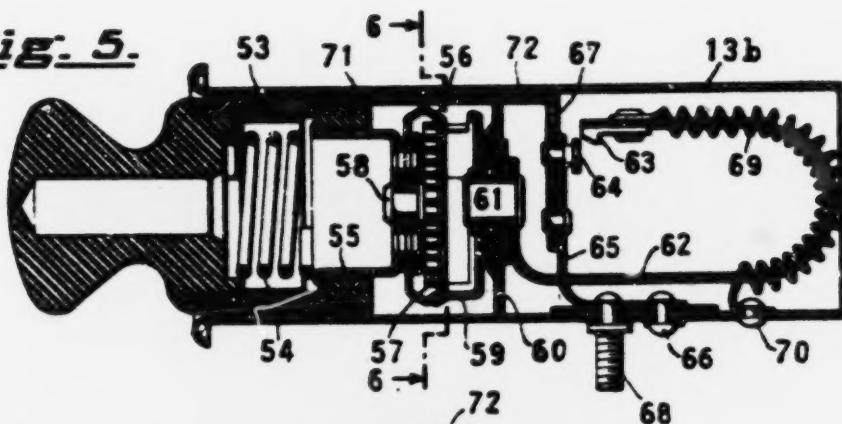


Fig. 6.

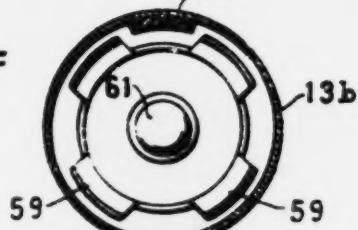
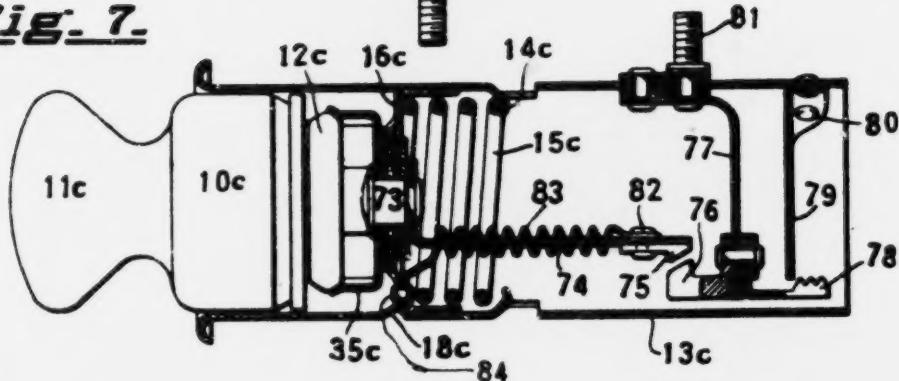


Fig. 7.



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UNITED STATES PATENT OFFICE

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ELECTRIC HEATER

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Application March 25, 1936, Serial No. 70,779

23 Claims. (Cl. 219—32)

My invention relates particularly to devices for lighting cigars and cigarettes. In plug-in type lighters it has been customary to provide some sort of switch which is held closed manually until the igniter is thought to be ready for use. I propose to provide means for latching a switch to close the circuit through the igniter for a predetermined time, and then automatically unlatching this switch and opening the circuit. In the preferred form this is effected by a thermostatic device heated independently of the igniter. I also provide a signal device for indicating when the circuit is broken.

One object is to provide a simple device of the well known type adapted to be installed in the instrument board of a car or other convenient place.

Referring to the drawings

Fig. 1 is a longitudinal section through one embodiment of this invention.

Fig. 2 is a detail of the switch parts of Fig. 1 with the circuit closed.

Fig. 3 is a longitudinal section of another embodiment of this invention.

Fig. 4 is a detail of the switch parts of Fig. 3 in closed position.

Fig. 5 is a longitudinal section of yet another embodiment of this invention.

Fig. 6 is a cross section on the line 6—6 of Fig. 5.

Fig. 7 is a longitudinal view partly in section of still another embodiment of the invention.

Referring to Figs. 1 and 2 the removable cigar lighter 10 is of the plug type having a handle portion 11 and carrying on its inner end a cup-shaped contact member 12 in which is located the usual spiral resistance element which is heated by electric current until it becomes incandescent. The stationary socket member 13 supports the plug in normal position. Portions of the socket are bent in as shown at 14 to constitute a stop against which the helical spring 15 contacts. The other end of the spring 15 engages the slidably sleeve 16 which shifts or slides within the socket 13, said sleeve being insulated from the central stem 17 by insulating washers shown on each side of the portion of the sleeve 16 around this stem.

Another stop 18 formed by bending in portions of the tubular socket limits outward movement of the sleeve 16 under the action of the spring 15. Slidably mounted on the central stem 17 and in electrical contact therewith is a tubular sleeve 19 having a flange at its inner end portion which constitutes a switch part 20 adapted

to be engaged and held by the latch 21 which is released by a thermostatic element. A spring 22 cooperates with the sleeve and with a washer 23 at the inner end of the stem 17. The bimetallic strip or thermostatic element 24 is of general U-shape as indicated and is wound throughout a substantial portion of its length by a resistance wire 25 which is adapted to heat the bimetallic strip 24 a desired amount to release and open the switch parts 20 and 21. The supporting socket 13 is grounded and current is supplied to the ungrounded terminal 26 to which is secured the flexible spring contact member 27 so that upon closing the switch, current passes through the switch parts 20 and 21 to the rivet 28 to which one end of the heating wire 25 is connected. The other end of the heating wire passes through the connected lead 29 to the rivet 30 which is grounded to the socket. The bimetallic strip 24 is insulated from the socket and held therein by the rivets 31 which clamp one end of the strip against the insulating material 32. One portion of the stem 17 is enlarged at 33 to constitute a stop against which the spring 22 presses the sleeve 16.

The forward portion of the stem 17 is riveted over and held within the tubular rivet 34 which supports the stem 17 and holds it in electrical contact with the abutment contact 35. This abutment contact is of the usual shape adapted for engagement with the outer or peripheral portion of the cup-shaped member 12. One end of the spiral resistance wire is secured to the cup-shaped member 12, according to the customary practice in this art, and the opposite end of the resistance wire is fastened to a central rivet (not shown) but which extends through the cup member and is insulated therefrom but in electrical contact with the other terminal 36 of the removable member which is adapted to contact with the inner surface of the socket. To insure the contact member 36 being in good electrical engagement with the socket it is customary to have a portion of the socket stamped out as a spring finger as is described, for example, in my copending application Serial Number 747,377, filed October 8, 1934, for Cigar lighter. The end portion 37 of such a spring finger is given a curved form as indicated in the drawings so that the contact member 36 may not only be engaged but also biased and held in a position with the cup-shaped contact member 12 in contact with the abutment contact 35.

Normally the removable plug is carried in an open circuit position with the parts in the position

shown in Fig. 1. To heat the lighter the plug 18 is pushed inwardly into the socket compressing the spring 16 until the switch member 28 is engaged and held in contact with spring contact 27 by the thermostatic latch or switch element 21 when the removable plug may then be manually released.

Upon its release the spring 16 slides the sleeve 18 to the left in Fig. 1 and moves the plug member outwardly until the sleeve 18 is engaged by its stops 18a, at the same time compressing spring 22 which is possessed of less strength than the spring 16, to the position shown in Fig. 2. Upon closing the switch parts 28 and 21 current is supplied for heating both the bimetallic strip 48 and the spiral resistance wire within the cup shaped member 12. The current for heating the bimetallic strip 48 passes from the terminal 26 through the contact spring 27, switch member 28, thermostatic latch 21 through the end portion of the thermostatic strip to the rivet 28, thence through the heating coil 50 to the ground connection at 58. The path of the current for heating the cigar lighter is from the terminal 26, through the spring contact 27, through the sleeve 18, rivet 24, abutment contact 38 to the rim of the cup member 12, thence through the spiral resistance wire to the usual central rivet which is insulated from the cup member 12 but contacted with the plug terminal 38 and thence to the grounded socket through the spring finger 37. The resistance wire 28 is so designed that it will heat the bimetallic strip 48 sufficiently to release the switch members 28 and 21 after a predetermined interval of time during which the spiral resistance wire of the cigar lighter has been heated. When the bimetallic strip 48 is heated its free end portion 21 moves upwardly in Fig. 1, until the switch element 28 is released.

Upon release of the switch element 28 the spring 22 pushes the sleeve 18 forwardly until its forward end portion 38 abuts the enlarged portion 38 of the stem 17 giving out sound enough on impact to constitute an audible signal of the cigar lighter being in readiness for use so that the user may withdraw the plug 18 from the socket and light his cigar or cigarette. After use the plug is put back in the socket into the position shown in Fig. 1. The spring finger 37 and its bent end 37 engage the plug contact 38 but do not offer as much resistance to inward movement of the plug as does the spring 16 so that upon inserting the plug in the socket the resistance offered by the spring finger 37 is small and noticeably less than that offered by the spring 16 during movement of the sleeve 18. The cup-shaped member 12 is maintained in engagement with the abutment contact 38 and after manual release of the plug with the switch members 28 and 21 closed, the bent end 37 of the spring finger prevents the plug from being moved out of the socket more than the desired amount and assists in maintaining the circuit closed through the abutment contact 38 and the cup-shaped member 12.

In Figs. 3 and 4 the plug 18a has the handle portion 11a, cup-shaped contact member 12a held as mentioned before within the socket 13a in contact with the abutment 38a and held in such contact by the bent end 37a of the spring finger engaging the contact 38a.

As was the case in Figs. 1 and 2 the sleeve 18a is shiftable between stops 18a and 18a, said sleeve 18a supporting a central stem 38 from which the sleeve is insulated. The rear end portion of the 75 stem is reduced as shown at 48 and carries an

insulating spacer member 41 with which the spring switch arm 42 is adapted to contact, said switch arm being carried by the spring arm conductor 43. A shoulder 44 is provided on the central stem 38 for engagement with the end portion of a leaf spring 45. One terminal 46 is insulated from the tubular socket 13a, but in contact with the spring 45 carrying the switch arm 41. The cooperative switch member 47 is shaped to latch the spring switch member 42. Current for heating the bimetallic thermostatic strip 48 is supplied through the heating coil 50, one end of which is in contact with the rivet 48 and the other end of which is grounded to the socket at 51. The thermostatic element is insulated from the socket and held in position by the rivets 52 which are likewise insulated from the socket, such rivets holding both the thermostatic element and the leaf spring 45 in contact. Unlike the embodiment illustrated in Figs. 1 and 2, the device of Figs. 3 and 4 has the current for the cigar lighter passed through the bimetallic element 48 but this thermostatic element is of such low resistance that this current for the cigar lighter does not alone heat the bimetallic strip enough to release the switch elements 42 and 47.

The operation of the device of Figs. 3 and 4 is substantially like that of the embodiment illustrated in Figs. 1 and 2. Upon pushing in the plug 18a the sleeve 18a is caused to move to the right against the action of the spring 45 until the switch member 42 is engaged by the thermostatic latch 41. Upon the release of the plug the spring 45 slides the sleeve 18a and the plug to the left until the sleeve is engaged by its stop 18a and the plug is in contact with the bent end 37a of the spring finger which biases the plug member into contact with the abutment 38a. When the switch members 42 and 47 are closed, current for heating the thermostat passes from the terminal 46 through the spring 45, switch members 42 and 47 to the rivet 48, and thence through the resistance wire 50 to the grounded contact 51. Current for the cigar lighter passes from the terminal 46 through the spring 45, switch elements 42 and 47, through the bimetallic strip 48 and spring 45 to the central stem 38, thence through the rivet 38a to the abutment contacts 38a, cup-shaped member 12a, thence through the spiral resistance wire in the usual manner to a central rivet which is connected to the plug contact 38a and the spring finger 37a. Upon release of the switch members 42 and 47, spring 45 causes the switch element 42 to be moved to the left into engagement with the insulating spacer member 41. An impingement of the switch part 42 upon the spacer 41 constitutes an audible signal that the thermostatic element has opened the circuit through the cigar lighter and that the same is ready for use.

The heating wires which are wound around the thermostatic or bimetallic elements in Figs. 1 to 4 must be insulated from the bimetallic strip enough to prevent the current short circuiting through this strip and yet not be thermally insulated from the strip because it is the heat from the resistance wires 28 and 50 which serve to heat up the bimetallic strip to an amount sufficient for it to unlatch the switch element held thereby.

In Figs. 5 and 6 is illustrated another embodiment of this invention. The plug 53 is provided with a spring 54 engaging the plug and a sleeve 55 carrying the cup-shaped contact member 56 at the rear end thereof. The usual spiral

heater wire 87 is in contact with the cup-shaped member 86 and also with a central rivet 88 which is insulated from the base of the cup-shaped member 86 by the insulating washers illustrated. The abutment contacts 89 are supported by but insulated from a stationary wall 90 within the socket which may be welded or otherwise held in place. As shown in the drawings, insulating washers on each side of the stationary wall 90 insulate this wall from a central rivet 81 which clamps the abutment contact as well as the end of a thermostatic element 82 against the wall 90. The other end portion of the bimetallic strip 82 is provided with a latching switch member 83 for engagement with the head of the switch member 84 carried by the spring arm 88 and supported by but insulated from the tubular socket member by the insulated rivets 88.

A strip of insulating material 87 is carried by the spring arm 88 and one terminal 88 is connected with the spring arm 88 as illustrated. The wire 88 heats the bimetallic strip, being connected at one end to the rivet adjacent the latch 83 and at its other end to the grounded rivets 78. In one preferred construction the contact members 88, 86c, or 71 are made smaller in diameter than the insulating plug member by which it is carried so that it can only make contact with the grounded socket tube through the spring finger 77 or 77a. In this way the circuit through the lighter can only be completed when the plug member has been pressed inward to close the switch and then released allowing it to resume its normal carrying position thus preventing any possibility of continuous heating of the heater wire on the plug member which could occur with the construction shown in Figures 1 and 2 or the intermittent heating that could occur with the construction in Figs. 3, 4, 5, and 6 where the thermostatic switch would continue to make and break the circuit as long as the plug was held in its extreme inward position and the grounded plug contact were in contact with the socket tube. The spring finger also provides a friction means of maintaining the plug in the socket but other frictional means well known in the art may be used. The ground plug contact is attached to the insulating plug such as screw threads, moweling as an insert, etc. In another construction the plug body 88 and the grounded plug contact 71 may be formed in one piece from a metallic shell.

A strip 78 which may be of insulating material is shiftable to the right in Fig. 5 by the plug and this strip is movable to the left upon release of the switch elements 83 and 84 by means of the spring arm 88.

With the parts in the normal position indicated in Fig. 5 no current is being supplied to the cigar lighter. Upon moving the plug 88 further into the socket the cup-shaped member 86 is held substantially stationary against the abutment contacts 89 and likewise the sleeve 86 is held substantially stationary but on this inward movement of the plug body the spring 88 is compressed. The inward movement of the plug shifts the strip 78 to the right in Fig. 5 causing the switch elements 83 and 84 to become engaged.

When no engaged current is supplied to the cigar lighter heater unit from the terminal 88 through the spring arm 88, switch elements 84 and 83, bimetallic strip 82, rivet 81, abutment contacts 89 to the cup-shaped contact member 86, thence through the spiral resistance wire to the central rivet 88 which is in contact with the

sleeve 86. The socket contact 71 slides with respect to the sleeve 86 so the current passes from the sleeve 86 through the contact 71 to the socket 136. Current for heating the bimetallic element 82 passes from the terminal 88 to the spring arm 88, the switch elements 84 and 83 to the rivet shown adjacent the latching end 83 of the thermostatic strip and from this rivet through the heating wire 88 to the grounded connection 78.

Upon release of the plug after the switch parts 84 and 83 have been engaged, the spring 88 pushes the main body portion of the plug outwardly inasmuch as the spring 88 presses indirectly upon the stationary abutment contacts 89 by means of the sleeve 86 and the cup-shaped member 86. Upon release of the switch parts 84 and 83 after the thermostatic strip has been heated to the desired amount, the spring arm 88 moves to the left under its inherent resiliency carrying the insulating strip 87 and pushing the strip 78 to the left until it assumes the position shown in Fig. 8, making an audible signal as it strikes the contact 71.

The embodiment illustrated in Fig. 7 contemplates the usual plug 18c having the handle portion 11c, cup-shaped contact 12c for engagement with the abutment contacts 38c.

The abutment contacts are carried by but insulated from a sleeve 18c within which is a coil spring 18c, one end of the spring being in contact with bent-in stops 14c and the other end of the spring in contact with the slidible sleeve 18c. A stop 18c limits outward movement of the sleeve 18c. The central rivet 78 clamps the abutment contacts 38c against the sleeve 18c and also against a bimetallic thermostatic strip 74 which is carried by the sleeve 18c. The rear end portion of the thermostatic strip 74 carries a latching member 76 for cooperation with the switch parts 78 carried by the spring arm 77 which is secured to but insulated from the socket as indicated.

Also carried by the spring arm 77 but insulated therefrom is a rasp 78 adapted for engagement with the free end portion of a diaphragm 79 which is secured at 88 to the socket 18c. The ungrounded terminal 81 supplies current through spring arm 77 when the switch parts 78 and 78 are closed, through the rivet 88 and thence through the heating wire 88 for the thermostatic element to the rivet 84 in the sleeve 18c, said sleeve being grounded and in contact with the socket 18c. When the switch parts 78 and 78 are closed, current for the cigar lighter passes from the terminal 81 through the spring arm 77, switch parts 78 and 78, through the bimetallic strip 74 to the rivet 78, abutment contacts 38c, cup-shaped member 18c and thence through the spiral resistance wire to the other plug contact and socket as was described in connection with Figs. 1 and 2.

Upon pushing the plug 18c inwardly the spring 18c is compressed and the latch 76 engages the switch element 78. Upon release of the plug the spring 18c slides the sleeve 18c and the plug outwardly or to the left to some extent flexing the spring arm 77, which possesses less strength than does the spring 18c. In moving the switch element 78 to the left in Fig. 7, the insulated rasp 78 likewise moves to the left under the influence of the spring 18c, causing the rasp teeth 78 to be moved over the diaphragm 79. Upon release of the switch parts 78 and 78 the spring arm 77 returns the switch element 78 to the position shown in Fig. 7 and in doing so some of the teeth 78

of the rasp 78 are again caused to quickly slide over the diaphragm 79 giving an audible signal and advising the operator that the cigar lighter is in readiness for use.

- 5 If desired the rasp may be replaced by a small hammer and the diaphragm by a gong or other device whereby percussion will give an audible signal. In another construction the rasp is not insulated from the spring arm 77 and a contact connected to a signal lamp is substituted for the diaphragm 79 so that the rasp, instead of creating an audible signal creates a visual signal by making and breaking the circuit through the signalling lamp. It will also be clear that a combined visual and audible signal can be obtained by insulating the diaphragm 79 from the socket tube, electrically connecting the rasp 78 to the spring arm 77 and allowing the diaphragm to serve both the creation of an audible signal and as a contact connected to a signal lamp so that both forms of signal are available to indicate to the operator that the thermostat has broken the circuit through the cigar lighter and that it is ready to use.
- 25 In the device of Figs. 3, 5, and 7 the bimetallic strip is of low enough resistance so that the current passing through it to the cigar lighter does not heat up this bimetallic strip sufficiently to cause the switch parts which are latched or held thereby to be released.

In Figs. 1 to 7 inclusive the wire which is wound around the bimetallic strip for heating the same should be electrically insulated therefrom. If desired, this heating wire may be bare and maintained out of electrical contact with the bimetallic strip by means of an open or perforate insulating sleeve so that convection currents of air passing from the heating wire may cause the heating of the bimetallic strip to augment the direct action of the coils 25, 58, 69 or 83. Heat from the igniter coil alone, however, is not as positive nor possessed of some of the mechanical and electrical advantages present when the heater for the thermostat is independent of or 45 in addition to the heater for the cigar or cigarette.

In the embodiment shown in Figs. 1 to 4 the spring fingers 37 and 37a engage the plug contact 36 and 36a only when the plug is in normal position. When the plug is pushed in to a position closing the thermostatic switch the circuit is open through the contacts 36 or 36a and 37 or 37a. In this way the circuit through the heater is not closed until after the plug has been returned to its normal position shown in Fig. 1 after the thermostatic switch has been closed. This is the preferred manner of operation for the devices of Figs. 1 to 4. In other words, the thermostatic switch does not close the circuit through the heater because at that time the heater circuit is open through the spring finger 37 or 37a being out of contact with the plug. The thermostatic switch, however, does open the heater circuit both of which close only after the plug has been moved inwardly and then moved outwardly by the spring, makes these forms of the invention safe against a user accidentally holding the plug in a pressed-in position.

70 Since many of the commercial cigar lighters on the market previously have required an operator to hold the plug pushed in to a circuit closing position, the present construction provides a safe way of educating the operator out 75 of his previous habit, because no matter how

long the plug of Figs. 1 to 4 may be held in a pressed-in position closing the thermostatic switch, the heater does not have its circuit closed until after the plug has subsequently been moved outwardly so that the contact 36 or 36a may engage the spring finger 37 or 37a.

I claim:

1. A cigar lighter comprising a removable member and a stationary member for supporting said removable member, a heater carried by the removable member, a thermostatic switch carried at least in part by one of said members and adapted to be closed by movement of said removable member beyond its normal position, circuit connections for supplying electric current for said heater through said thermostatic switch, a spring carried by said removable member for cooperation with said stationary member for moving said removable member longitudinally of the stationary member after closing said switch and a second switch in the heater circuit open only when the removable member is moved inwardly beyond its normal position.

2. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater after the same has been closed, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging said heater contact and against which said heater contact is adapted to be pressed, a switch in said heater circuit carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being constructed for closure on inward movement of at least a substantial portion of said removable member, a spring cooperating with the stationary and removable members and carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, detent means for holding said heater contact in engagement with said abutment, one of the contacts carried by said removable member being in front of and insulated from said heater contact but in electrical circuit therewith through the heater, said detent means serving as a contact whereby the heater circuit may be completed only when said detent means is in engagement with said contact carried by the removable member in front of the heater contact.

3. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member and constructed for opening the circuit through the heater after the same has been closed, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging said heater contact and against which said heater contact is adapted to be pressed, a switch in the heater circuit, carried by the stationary member and adapted to be opened by

said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring cooperating with the stationary and removable members and carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, one of the contacts carried by said removable member being in front of and insulated from said heater contact but in electrical circuit therewith through the heater, and a spring cooperating with said switch parts and carried by said stationary member and of such strength as to be adapted for opening said switch when the switch is released by said temperature responsive means without disengaging the heater contact from said abutment contact.

4. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact.

5. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion

of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact, said temperature responsive switch having a shiftable element carried by said support for the abutment contact and movable relative thereto, said spring for actuating said switch cooperating with said shiftable switch element and with said support for the abutment contact, the first mentioned spring being stronger than the second mentioned spring.

6. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means, without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact, said temperature responsive switch having a shiftable snap element carried by said stationary member for conducting current to the heater and temperature responsive means, said snap element being carried by said second mentioned spring and said first mentioned spring being stronger than said second mentioned spring, and electrically in series therewith.

7. A cigar lighter comprising a removable

member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means, without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact, said temperature responsive means being carried by and movable with said support for the abutment contact, and a rasp and a diaphragm both carried by the stationary member for actuation by said temperature responsive means.

3. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring cooperating with said stationary and removable members and carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater and a spring carried by said stationary member and of such strength as to be adapted for opening said switch when the switch is released by

said temperature responsive means without disengaging the heater contact from said abutment contact, said first mentioned spring being carried by said removable member and said abutment being mounted in a fixed support in said stationary member but insulated therefrom, said temperature responsive means at one end thereof being also supported by said fixed support, and a shiftable element between said removable element and switch, adapted to be moved in one direction by said removable member and in the opposite direction by said second mentioned spring.

9. A cigar lighter comprising a stationary member and a removable member carried by said stationary member, a heater on said removable member, contacts on the removable member connected to said heater and normally engaged with contacts on the stationary member, a thermostatic switch on one of said members, said switch being constructed to be closed on inward movement of said removable member, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon manual release of said removable member and a second spring cooperating with said switch parts and of such strength as to be adapted to open said switch without substantially affecting the position of said removable member.

10. A cigar lighter comprising a stationary member and a removable member carried by said stationary member, a heater on said removable member, contacts on the removable member connected to said heater and normally engaged with contacts on the stationary member, a thermostatic switch on one of said members, said switch having a member carried thereby and being closed on inward movement of said removable member, a spring for moving said removable member outwardly upon manual release of said removable member, an audible signal means, a shiftable part carried by the stationary member, and a second spring adapted to open said switch without substantially affecting the position of said removable member, said second mentioned spring causing said member carried by the switch to engage a shiftable part carried by the stationary member and actuate said audible signal means.

11. A cigar lighter comprising a removable member, a stationary member for supporting said removable member, a heated member carried by the removable member, a circuit for supplying energy to said heated member, a switch for controlling said circuit, a bimetallic strip carried by one of said members for releasing said switch, another circuit for heating said strip upon closure of said switch by movement of said removable member with respect to the stationary member, and a spring for moving said switch to open the first circuit upon its release by the action of said bimetallic strip, and another spring for moving said removable member after its movement to close said switch.

12. A cigar lighter comprising a removable plug, a socket for supporting the plug, a heated member carried by the plug, a switch carried at least in part by said socket for controlling the supply of energy to said heated member, an abutment in said socket against which the plug is adapted to be held when in said socket, a bimetallic strip extending in rear of said abutment and adapted when heated to release said switch, and spring means for sliding the plug forward.

ly after its manual release and a second spring means cooperating with said switch parts for opening said switch after its release by said strip and while said abutment and plug are in contact.

13. A cigar lighter comprising a tubular socket, a plug removably carried in said socket, a heater on the inner end portion of said plug, a transverse, sliding wall intermediate the ends of said socket, a delay action switch within the socket in rear of said transverse wall, a heater contact carried by said wall and adapted to cooperate with said heater when the same is adjacent said wall, said wall and socket being adapted to shield said switch against the transmission of heat by radiation or convection from the heater.

14. A cigar lighter comprising a stationary member, a removable member, a heater carried by said removable member, a delay action switch carried by one of said members for automatically opening an electric circuit through said heater after the same has been closed by inward movement of said removable member, an abutment on the stationary member, a spring cooperating with said abutment and with at least a substantial portion of the removable member and adapted to move at least said substantial portion of the removable member outwardly upon release of the removable member after closing said switch, and a second spring in cooperation with said switch parts and adapted to separate the parts of said switch after their release and without substantially affecting the position of said removable member, and a signal responsive to the release of said second spring from a position in which said second spring is stressed when the switch is closed.

15. A cigar lighter comprising a stationary member, a removable member carried by the stationary member, a heater carried by the removable member, a switch carried by the stationary member and adapted to be closed by movement of the removable member with respect to the stationary member, a spring for returning said removable member to its normal position after closing said switch, means for holding said switch closed, delay action means for opening said switch, and another switch closed only when the removable member is in its normal position, both of said switches being in the heater circuit, whereby current is not supplied to the heater until after the removable member has been returned to its normal position after closing the first mentioned switch.

16. A cigar lighter comprising a stationary member, a removable member adapted to be carried by said stationary member, a heated member on the removable member, two switches controlling an electric circuit for said heated member, one of them being adapted to be closed on inward movement of said removable member beyond its normal supported position, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon release of the removable member, another of said switches adapted to be closed by such removable member only when the same is in its normal supported position on said stationary member, and delay action means for opening one of said switches.

17. A cigar lighter comprising a stationary member, a removable member carried by the stationary member, a heated member secured to the removable member, a switch controlling an electric circuit for said heated member and adapted

to be closed on inward movement of said removable member beyond its normal supported position, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon release of the removable member, delay action means for opening said switch and the circuit through said heated member, and means for opening the circuit through the heated member during inward movement of said removable member.

18. A cigar lighter comprising a stationary member, a removable member carried by the stationary member, a heated member secured to the removable member, a switch controlling an electric circuit for said heated member and adapted to be closed on inward movement of said removable member beyond its normal supported position, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon release of the removable member, delay action means for opening said switch and the circuit through said heated member, and means for opening the circuit through the heated member during inward movement of said removable member regardless of whether said switch be open or closed.

19. In a cigar lighter the combination with a stationary member, of a removable member, an igniter carried by one of said members, electric current contacts for each of the members, a switch carried by one of them in addition to said contacts, means for closing said switch on movement of the removable member from normal position with respect to the stationary member, means for returning the removable member to normal position, and a delay action means for opening the switch while the removable member is maintained in its normal position with its contacts engaged with those of the stationary member.

20. An electric lighter comprising a socket constituting a contact, a contact mounted to slide in the socket but insulated therefrom, a slidable support for said contact, a rod carried by said slidable support, a spring for sliding said rod and its associated contact forwardly, a switch member slidable on said rod, a spring for moving said switch member on said rod, a latch for holding said switch member, a heater for moving said latch to release said switch member, said socket being adapted to receive an igniter with a coil and circuit contacts, one of the latter contacts being adapted to engage the socket and the other circuit contact being adapted to engage the slidable contact when the plug is in the socket.

21. In a cigar lighter the combination with a stationary member, of a removable member, an igniter carried by one of said members, electric current contacts for each of the members, a switch carried by one of them in addition to said contacts, means for closing said switch on movement of the removable member from normal position with respect to the stationary member, means for returning the removable member to normal position, and a delay action means for opening the switch while the removable member is maintained in its normal position with its contacts engaged with those of the stationary member, the circuit being opened through the igniter when the removable member is held in front or behind its normal position.

22. In a cigar lighter, a socket having two circuit contacts one of which is insulated from the other, one of the contacts constituting a latch, a plug removably supported in the socket and hav-

ing a contact normally electrically connected to one of the socket contacts and a second contact, an igniter element connected between the two contacts of the plug, two contacts electrically connected together and movable in the socket between the latch and the plug, one of which is movable with respect to the other and one of which is adapted to interlock with the latch, one of the said latter contacts being adapted to be engaged by a contact of the plug when the plug is moved inwardly in the socket, a spring moving one of the interior socket contacts to close a circuit between the plug and the socket when pressure on the plug is released and a spring moving the other interior contact to break the circuit when the latch is released and delay action means for releasing the latch to permit one of the springs to act and break the circuit.

23. In a cigar lighter the combination with a stationary member, of a removable member, an igniter carried by one of said members, electric current contacts for each of the members, a switch carried by one of them in addition to said contacts, means for closing said switch on movement of the removable member from normal position with respect to the stationary member, means for returning the removable member to normal position, and a delay action means for opening the switch while the removable member is maintained in its normal position with its contacts engaged with those of the stationary member, the delay action means being independent of and substantially unaffected by the temperature of said igniter. 10 15

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May 17, 1938.

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2,117,703

CIGAR LIGHTER

Original Filed July 23, 1932 2 Sheets-Sheet 1

Fig. 1

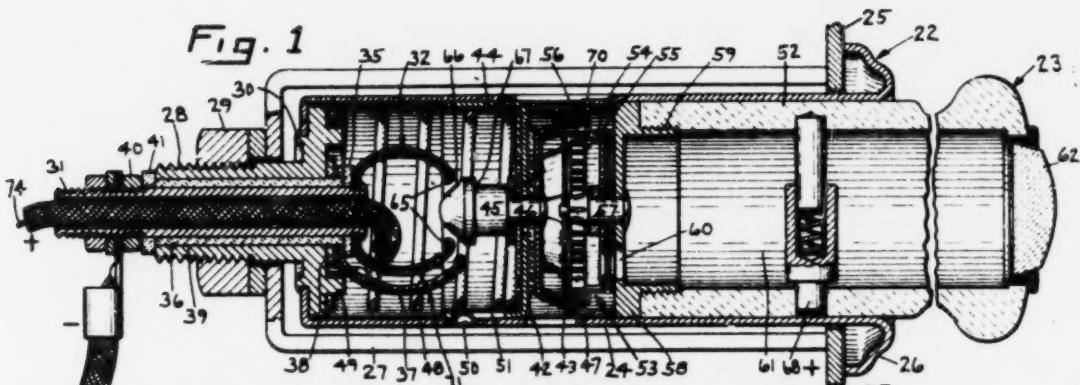


Fig. 2

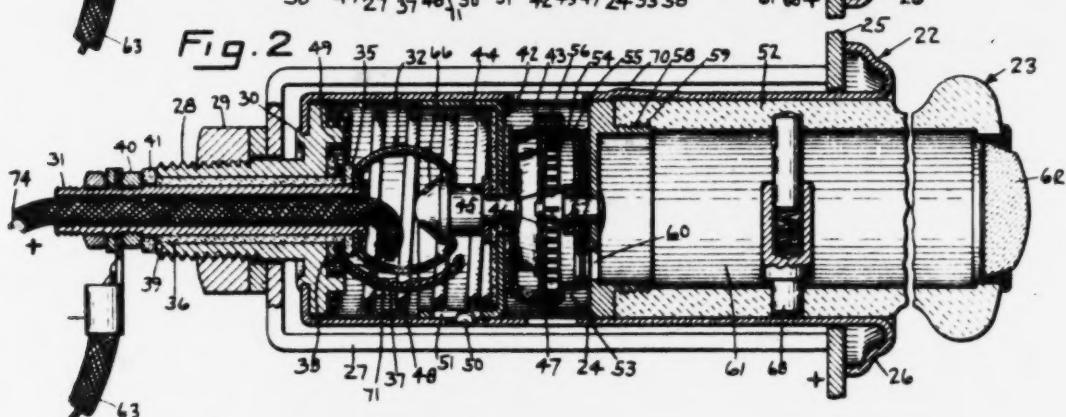


Fig. 3

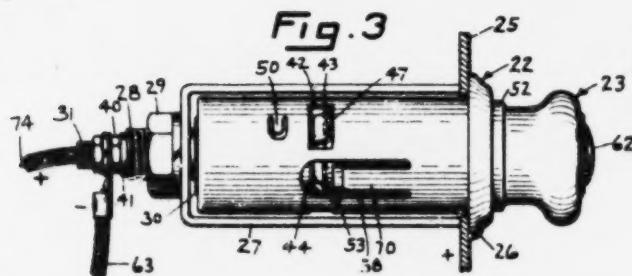


Fig. 4

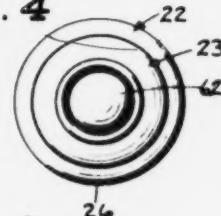


Fig. 5

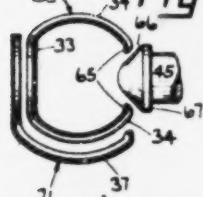


Fig. 6

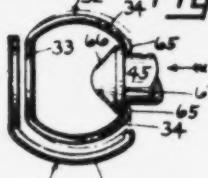
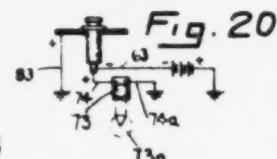
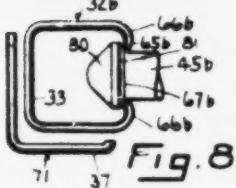
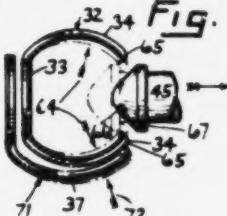


Fig. 7



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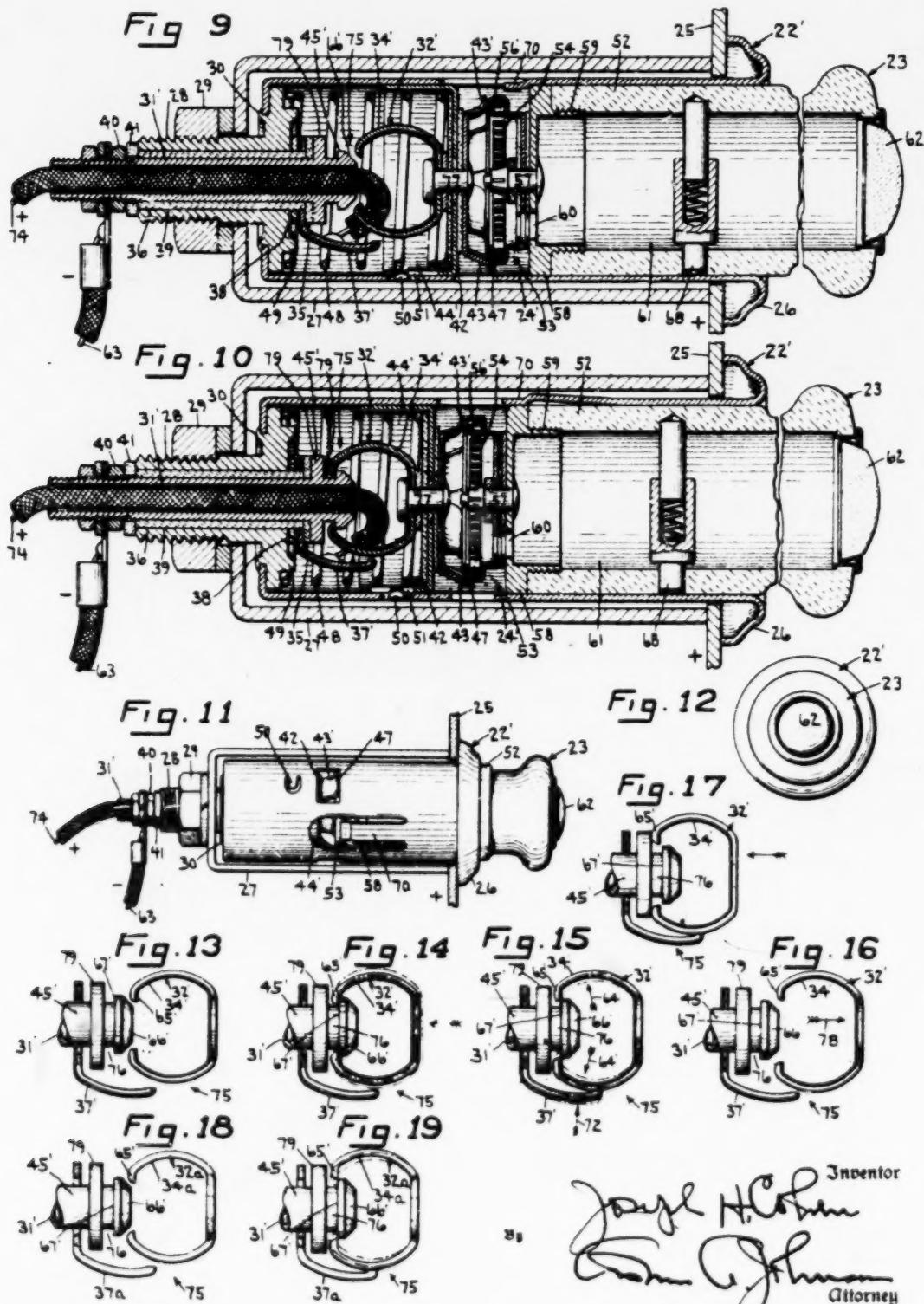
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CIGAR LIGHTER

Original Filed July 23, 1932

2 Sheets-Sheet 2



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Patented May 17, 1938

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UNITED STATES PATENT OFFICE

2,117,703

CIGAR LIGHTER

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Application July 23, 1932, Serial No. 624,193
Renewed August 5, 1937

17 Claims. (Cl. 218—32)

This invention relates to improved cigar and cigarette lighters, particularly of the types for use in automobiles.

Most lighters of this type, which have been manufactured heretofore, are so designed that it is necessary for the driver to push against a movable igniter unit or to press a switch button for an extended period of time in order to close an electrical circuit for the purpose of heating the lighter to incandescence. However, these lighters required the driver to continuously divert his observation from the road to the cigar lighter, in order to observe when the igniting unit thereon was heated to incandescence and in condition for use, the heated wire itself serving as an indicator. Besides diverting the driver's observance of the road it necessitated his driving with only one hand while forcing the movable member of the cigar lighter or forcing a push button to circuit closing position with his other hand over a somewhat extended period of time.

In order to overcome the latter disadvantage, some lighters have been constructed with a bayonet lock or its equivalent, which holds the removable unit of the cigar-lighter in circuit closing position so that the igniting coil would be heated to incandescence without the necessity of pushing and holding the removable unit or push button switch in circuit closing position. However, these cigar-lighters, with the bayonet lock, had the marked disadvantage of keeping the circuit closed for an extended time and sometimes even dead shorting the battery of the car for so long a time that complete recharging was necessary in the event of the driver forgetting that he locked the removable igniting unit in closed circuit condition.

With both of these types of lighters, with and without bayonet lock, which are the types most generally in use, there is a strong likelihood of keeping the circuit closed over too long a period of time; this, in addition to the hereinbefore mentioned disadvantages of requiring the operator or driver to take one hand from the wheel and hold the cigar-lighter in closed circuit condition for an extended period of time, and to divert his gaze from the road to the cigar-lighter in order to ascertain when it may be lifted from the instrument panel for use.

It is an object of the present invention to provide an electric cigar-lighter in which it is not necessary for the driver to divert his gaze from the road ahead nor to keep his hand away from the wheel for any considerable extent of time,

the elimination of which makes for greater safety while driving the car.

It is a further object of the present invention to provide a cigar-lighter which will be maintained in closed circuit condition just long enough to heat the igniting coil to incandescence, and with no danger of an excessive drain on the battery.

In its broader aspects, the present invention provides a cigar-lighter wherein it is merely necessary for the driver to move the same in one direction, whereupon the circuit to the igniting coil will be closed and the igniting unit will be automatically held in closed circuit position until the igniting coil is heated to incandescence whereupon the circuit will be broken automatically so that there is no further drain upon the battery, thus, minimizing the skill, care, and effort on the part of the driver.

Also, and of particular importance, the lighter of the present invention, is arranged to give a suitable warning to the driver when heated to incandescence and the circuit is opened, so that there is no danger of the igniting unit cooling after it is heated, as might occur if the driver inadvertently waits too long before picking it up for use.

A feature of the present invention is the provision of means for closing the circuit to the lighter in order to improve the thermal condition of the lighter even though the regular thermally responsive circuit closing contacts are still in the thermally separated and circuit opening position.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a longitudinal sectional view of the cigar-lighter of the present invention in normal inoperative position.

Fig. 2 is a view similar to Fig. 1, but with the cigar-lighter in closed or operative position.

Fig. 3 is a plan view of the cigar-lighter.

Fig. 4 is a front view.

Fig. 5 is a detail view showing the thermostatic catch of the present invention in the inoperative position.

Fig. 6 is a detail, similar to Fig. 5, but shows the catch in the operative position.

Fig. 7 is a view similar to Figs. 5 and 6, but shows the catch in its partly released condition and in position to close a warning device circuit.

Fig. 8 is a detail view of a modified form of catch in the closed condition, similar to Fig. 6.

Fig. 9 is a longitudinal sectional view, similar to

to Fig. 1, but with a modified form of catch and circuit closer, in the normal inoperative position.

Fig. 10 is a view similar to Fig. 9, but shows the parts in the operative position.

Fig. 11 is a plan view of the lighter shown in Figs. 9 and 10.

Fig. 12 is a front view.

Fig. 13 is a detail view of the circuit closer and thermostatic catch of this form of the invention in the open inoperative position, similar to Fig. 9.

Fig. 14 is a detail view, similar to Fig. 13, but shows the catch in closed circuit position.

Fig. 15 is a detail view, similar to Fig. 14, but shows the catch in its partially released position, and in position to close an auxiliary warning device circuit.

Fig. 16 shows the catch and circuit closing parts returned to the open inoperative position.

Fig. 17 is a view similar to Fig. 16 of the invention showing the catch used to effect an auxiliary closing of the circuit even though the catch is thermostatically maintained in an open position.

Fig. 18 is a view similar to Fig. 13, but shows the catch and circuit closer parts made of regular material, rather than bimetallic material.

Fig. 19 is a detail view, similar to Fig. 18, in the closed circuit position and about to be released.

Fig. 20 is a wiring diagram.

For convenience and clarity in the following description, the present invention is shown as applied to what may be termed "sleeve-type" cigar-lighters for use with automobiles, similar to the lighter disclosed in my copending application, Serial No. 357,030, but it should be understood that it may also be used with other types of cigar-lighters. Broadly, the cigar-lighter comprises a base member 22 and a removable igniting unit 23 which may be mechanically and electrically separated from the base member for use.

The base member 22 comprises a socket 24 adapted to be passed through a suitable aperture in an instrument panel 25 of an automobile, or other convenient location, until a flange 26 at the front end thereof engages with the front face of the panel. The socket is rigidly secured in place with a U-shaped yoke 27 fitted over an outer sleeve 28 and a clamping nut 29. The outer sleeve is preferably rigidly secured to the socket 24 by a spun-over flange 30.

A contact carrying sleeve 31 is insulatedly mounted in the outer sleeve 28, and at its forward end there is secured a main contact 32 having a main body portion 33 shaped similar to a washer and one or more integral hook-shaped fingers 34 extending therefrom. The contact carrier sleeve is secured in place by passing a washer 35 and tube 36 of insulation over the contact sleeve 31, passing an auxiliary contact 37 and insulating washer 38 over the insulating sleeve 36, and then passing the entire assembly through a bore 39 of the outer sleeve 28, where it is rigidly secured to the latter part with the nut 40 and insulating washer 41. These various parts of insulation just described prevent electrical connection between the contact sleeve 31 and outer sleeve 28 and are preferably made of mica in order to be heat-resisting.

The base member is completed with a slide 42 which carries an intermediate contact 43. This slide comprises a cup 44 which has a free fit within the socket 24. Near its center the cup is provided with a contact and catch stud 45 which is insulated from the cup by suitable insulating washers. It is held in place by spinning or otherwise heading-over the end of the shank 46, and when this is done a contact washer with yield-

ing fingers 47 forming the intermediate contact 43 is secured to the cup so that current may be passed from the contact 45 to the fingers. The cup also serves to hold a spring 48 in the socket other end of the spring is located in the socket by a shoulder portion 49 of the outer sleeve 28. Longitudinal movement of the slide 44 is limited in two directions by a lanced finger 50 part of the socket 24 being bent into and engaging the ends of a slot 51 in the cup.

The removable igniting unit 23 comprises a body 52 preferably made of bakelite or some similar insulating material of a size to slide freely in the socket 24. At one end it supports a heater unit 53 comprising a spirally wound heating coil 54 in a cup 55. One end of the heating coil is connected electrically to the outer wall of the shell by means of a ring 56 which is spun thereon and the other end of the coil is connected to a stud 57 in the slot. This stud passes through a suitable hole in the shell 55 and is insulated from the latter with suitable insulating washers. It is mechanically and electrically secured to a ring 58 which has a threaded connection 59 with the igniting unit body. The heater unit 53 is provided with a series of holes 60 which allow the incandescent glow of the heating coil to pass through a bore 61 of the body 52 to the front end of the igniting unit 23 where they are magnified and projected by means of a ruby glass 62, or by a disk of Catalin or similar light-conducting material.

The wiring circuit for the cigar-lighter comprises a ground connection through the instrument panel 25, flange 26 and the yoke 27 extending one side 63 of the car battery circuit to the socket 24 portion of the base 22 and the other pole of the circuit comprises a wire 64 from the battery connected to the contact sleeve 31 and rigidly secured thereto with a nut.

Now, of particular importance, the cigar-lighter is, according to the present invention, arranged to prevent an excessive drain on the battery, and to lessen the amount of attention required from the driver. To this end, there is provided a novel catch for holding the igniting unit in energizing position and a novel circuit closer switching arrangement for automatically controlling the circuit between the sliding contact stud 45 and the stationary main contact 32.

This special catch and thermostatically controlled switch is, according to the present invention, made as a unitary structure; that is, both are embodied together and it is thereby possible to effect a marked economy in the cost of manufacture, because fewer parts are required and a single assembly and adjustment takes care of both the catch and the thermostatically controlled switch. In its present preferred form this combined catch and thermostatically controlled switch comprises the main contact 32, made of bimetallic material in order to be responsive to thermal conditions of the latter. The fingers thereon are of narrow width and slightly bowed so that there is a marked tendency for these fingers to spread or to open up in the direction of the arrows 64 in Fig. 7 to the solid line position shown in the latter figure under the influence of heat.

These fingers are provided with hooks 65 at their outer ends which are adapted to engage with a bevel 66 on the front end of the main contact stud 45 and be forced apart thereby and then snapped in back of a shoulder 67 portion of the stud when the sliding sleeve is pushed to-

ward the bottom of the socket into position shown in Fig. 2.

The contact finger hooks 65 thus positively lock the sliding sleeve 44 in the closed position and at the same time complete an electrical connection from the main contact sleeve 31, contact 32, and the stud 45 to the intermediate contact disk 43 and also through the ring 56 and stud 57 of the removable igniting unit 23 to complete the circuit to the heating coil 54 to energize the coil and bring it to incandescence.

As the heating coil 54 is brought to incandescence some of the heat is radiated from the front face of the coil against the inside of the disk 43 and follows through the ring and contact fingers 47. As the fingers are heated in this manner some of the heat follows through to the stud 45 and fixed contact fingers 34, and at the same time heats the air within the chamber formed by the socket 24 and shell 44, to cause the contact fingers to expand gradually in the direction of the arrows 64 (see Fig. 7) until the hooks 65 move clear or free of the shoulder 67 whereupon the spring 48 is free to again move the sliding sleeve 44 forwardly in the socket 24 until the movement is stopped by the lanced ear 66 engaging an end of the slot 51 as shown in Fig. 1. At the same time it pushes the removable igniting unit 23 forwardly in the socket and moves the contact 45 of the switch into open circuit or de-energizing position shown in Figs. 1, 5 and 7.

It should also be noted that the particular form of switching unit and contacts provided therefor by the present invention have the very desirable advantage of making it unnecessary for the operator to twist, push, or in any special manner rotatably align the removable igniting unit 23 relative to the base 22 when returning the unit to the inoperative position on the base, or to do any involved twisting or aligning when it is desired to move the removable igniting unit into the operative or energizing position. It is merely necessary to put the plug 23 into the socket 24 when placing one with the other and merely necessary to push against the end of the igniting unit in order to move it to energizing position.

Normally the igniting unit 23 is in the position shown in Fig. 1 for the driver or other occupant of the car, after using the unit, merely slides it into the socket 24 until the cup 55 and ring 56 thereon engages with the spring contact fingers 47 of the slide 44. The pressure of the spring 48 on the sliding member serves as a stop or indication that the unit has been slid fully into the inoperative position. A spring plunger 68 is located in the plug body 52 to impinge against the bore of the socket 24 and prevent the igniting unit 23 from working out of the socket even though the car vibrates badly.

When it is desired to use the cigar-lighter the driver merely grasps the knob portion of the igniter unit body 52 and pushes it deeper into the socket against the pressure of the yielding spring 48 whereby the bevelled end 66 of the contact plug 45, as the unit slides in the socket 24, engages with the hooks 65 to spread the fingers 34 until the hooks snap over the shoulder 67 as shown in Fig. 6, to lock the sliding unit in the back and switch closing position. Preferably a long finger 78 is lanced inwardly of the socket 24 with a raised portion adapted to engage and complete electrical connection between the socket 24 and igniting unit if the bore of the socket becomes worn considerably. The op-

erator may then release his grip on the igniting unit and again use both hands for driving while the coil 54 is being heated to incandescence.

As the coil comes up to heat, some of the heat travels through the stud 45 and gradually moves the fingers of the bimetallic contact member to open position while the hooks thereon ride over the shoulder portion 67 of the stud 45 until a release between the shoulder and hooks is effected and the igniting unit moved back into the inoperative position shown in Fig. 1 under the influence of the sliding sleeve 44 and spring 48. Thereafter, the driver pulls the lighter from the socket for use.

The light disk 62 at the outer end of the igniting unit 23 serves to transmit an incandescent glow from the heater coil and warn the operator that the lighter is in condition for use. However, this would necessitate the driver glancing at the lighter from time to time in order to know when it was properly heated.

According to the present invention, a positive warning is provided to help the driver and make it unnecessary for him to continuously or sporadically observe the lighter. This novel warning device comprises a switch 71 adapted to be closed automatically when the igniting unit has been brought to the desired degree of incandescence. This switch comprises the contact member 37 of bimetallic material so arranged that when the igniting unit is in the operative position shown in Fig. 2 and is being brought to incandescence, the heat thereof is transmitted to the contact member 37 which curves in the direction of the arrow 72 in Fig. 7, while the main contact arms 35 or fingers 32 move in the direction of the arrows 64. This warning device contact member is located and adjusted so that it contacts with the finger 34 just before and during release of the contact stud 45 from the hooks 65 as shown in Fig. 7. The circuit is completed to a bell 73, or other preferably audible warning device, through a wire 74 connected to the contact 37, of one polarity, while current of the other polarity passes through the wire 74a to the warning device as shown in the wiring diagram, Fig. 20.

Thus, it is merely necessary for the operator or driver to give the igniter unit 23 a quick push into the operative position in Fig. 2, and thereafter continue driving, or otherwise using both heads, and without diverting his eyes from the road ahead, for the structure provided by the present invention automatically returns the igniting unit to inoperative and electrically disconnected positions, and at the same time warns the operator audibly that the lighter has been put into condition for use to light a cigarette, or the like. If preferred the warning device switch 71 provided by the present invention may be used to close the circuit to a lamp, such as the lamp 73a, shown by dot and dash lines in Fig. 20, located in a place remote from the cigar-lighter and close to the regular line of driving vision.

In Figs. 9 to 16 inclusive, there is shown a modified form of the present invention. The removable igniting unit 23 in this form of lighter is exactly the same as that shown in the first form of the invention. The base member 22, however, while like the base member 22 of the preferred form of the invention in many respects is provided with a different form of catch and switch unit 75 comprising a contact stud 45' made integral with a contact sleeve 31' and a sliding sleeve 44' is arranged to support and carry a yielding

bimetallic contact member 32' with bowed fingers 34' and hooks 65'.

The fingers 34' and hooks 65' are normally in the closed position shown in Fig. 9, and are adapted to ride over a bevel 66' on the end of the contact sleeve 31' and hook into a groove 76 in back of the shoulder 67', as shown in Figs. 10 and 14. With this form of the present invention, as with the preferred form, it is merely necessary for the operator to push the igniting unit 23 longitudinally into the bore of a socket 24' portion of the base 22' until the hooks snap into the groove 76 whereupon current is conducted to the outer end of the heater coil 54 through the stud 77, contact fingers 42', and ring 58', the circuit being completed by the closed line between the panel 25, shell 24', ring 58, and stud 57 to the inner end of the coil.

When the switch 75 is closed and as the heater coil is brought to incandescence the spring contact fingers 34' and hooks 65' gradually open from the position shown in Fig. 14 in the direction of the arrow 64' and into the position shown in Fig. 15 until the hooks are free of the shoulder 67' portion of the groove 76, whereupon the sliding unit and hook carried thereby, under the influence of the spring 48, travel in the direction of the arrow 78 shown in Fig. 16 to move the igniting unit again into the inoperative position shown in Fig. 9.

As with the preferred form of the invention, this form may be provided with a warning device, including the contact member 37' insulatedly mounted on the modified form of contact sleeve 31'. Here again the signal contact 37' is made of bimetallic material and curves inwardly in the direction of the arrow 72' (see Fig. 15) as the main contact member 32' carried by the sliding sleeve 44' moves outwardly under the influence of heat in the direction of the arrows 64' until engagement occurs with the signal contact, just before and during release of the switch, when the lighter has been brought to incandescence. The wiring for this signal contact is the same as for the preferred form of the invention already described.

This modified form of the present invention has the advantage of making it possible for the operator to manually manipulate the lighter to obtain a further degree of incandescence without waiting for the main contacts 32' to cool and resume their normal closed position, and to this end there is provided a flange 78 which contacts with the ends of the hook 65' when the igniter is pushed the full extent toward the back of the base member as shown in Fig. 17.

It should be particularly noted that, according to the present invention, the warning device need not be operated as the igniting unit is moving into the operative position, but will only be operated after the igniting unit is heated and ready for use. This is accomplished by arranging the signal device contact so that it moves toward the regular contacts 32' as the lighter is brought to the proper degree of incandescence. When the signal contact 37 or 37' is cold, as when the igniting unit 23 is moved to the operative position, the bevel at the end of the contact stud 65 cannot spread the main contacts sufficiently for them to engage the signal contact and close the signal circuit. However, when the various contacts are heated and the main contacts spread sufficiently to clear the contact stud, for release, the heated signal contact 37, which has con-

tracted, is in a position to close the signal circuit.

In Figs. 18 and 19 there is shown a further modified form of the present invention comprising a yielding contact member 32a, having fingers 34a similar to and arranged to ride over the bevel 66' and snap into grooves 76 in much the same manner as the contact member 32', shown in Figs. 13 and 14, or the contact members 32 shown in Figs. 5 and 6. The parts are proportioned to expand the arms as the heater coil is brought to the desired degree of incandescence. This form of yielding contact member may be used in order to effect greater manufacturing economy and it may be more advantageous than the bimetallic form in lighters which are brought to incandescence only slowly, or if the cigar lighter construction is such that there is a quick flow of heat from the heater coil to the yielding contact member; in other words, where it is desired to have a slowly responsive device. Also, it may be preferred to use a solid contact member 37a as a signal contact rather than the bimetallic form. However, with this form, the contact 37a is shielded or mounted to prevent it from receiving a flow of heat from the heater coil and thereby cause it to remain stationary while the yielding contact members gradually expand from the heat of the coil 54.

If preferred, the catch and switch of the present invention may be, as shown in Fig. 8, arranged to close the circuit to the warning device only as the removable igniting unit is fully heated and is actually travelling to the inoperative position, and not at all prior to such movement. For this purpose, the yielding contacts 32b are provided with slightly longer hooks 65b and a contact stud 45b having two bevels 66 and 67. This arrangement is such that the hooks 65b on the contact fingers slide first over the bevel 66 and then down over the second bevel 67 to hook in back of a shoulder 67b when the operator pushes the igniting unit into place. When the heater coil is brought to incandescence the yielding contact member expands until the ends of the hooks 65b reach the bevel 67. Thereafter, the straight wall or shoulder 67b no longer holds the sliding sleeve back, and as the contact stud 45b is moved relative to the yielding contact member 32b the bevel 67 expands the heated yielding contact members 32b a slight greater extent to close the gap with the signal contact 37b. Thus, the bevel 67 and pressure of the spring 48 may be used to close the warning device circuit and makes unnecessary any close adjustment between the regular circuit control contacts and the warning device contact.

Cross reference is made to my copending application S. N. 118,838, filed January 2, 1937, which is a division of the present application and wherein are claimed certain features of the invention herein disclosed.

Other variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new and for which it is desired to obtain Letters Patent, is:-

1. In an electric cigar-lighter, the combination of a base member; a plug removably supported on the base member and movable thereon into longitudinal different operative and inoperative positions; an electrical heating coil on said plug; a warning device; and means, including thermostatically controlled means responsive to the tem-

perature of the heating coil, adapted to move said plug from its operative position longitudinally relative to the base to its inoperative position when said coil is heated a predetermined extent 5 and to render said warning device operative.

2. In an electric cigar-lighter, the combination of a base member; a unit removably supported in operative and inoperative positions by said base member; a heating coil on said unit; means for 10 moving the removable unit in the base member from its operative to its inoperative position; a bimetallic catch associated with said means; a warning device; a bimetallic element associated with said warning device, said bimetallic catch 15 and bimetallic element moving into engagement one with the other in response to the increase in temperature of the heating coil and in this movement releasing the first-named means and moving the removable unit to its inoperative position 20 and actuating the warning device.

3. In an electric cigar-lighter, the combination of a base member; a unit removably supported by said base member in operative and inoperative positions; a heating coil on said unit; means for 25 automatically moving the removable unit in the base member; a thermostatic catch responsive to the increase in temperature of the heating coil to release the first-named means; a warning device; and a warning device contact, said thermostatic 30 catch being adapted to automatically move into engagement with said contact and actuate the warning device.

4. In an electric cigar-lighter, the combination of a base member; a unit removably supported 35 by said base member; a heating coil on said unit; means for automatically moving the removable unit in the base member; a thermostatic catch responsive to the increase in temperature of the heating coil, to release the first-named means; a 40 warning device; a warning device contact; and means for effecting positive relative movement between the catch and the contact to actuate the warning device when the catch is released by the action of the heating coil.

45 5. In an electric cigar-lighter, the combination of a base member; a unit removably supported by said base member in operative and inoperative positions; a heating coil on said unit; yielding means for automatically moving said unit on the 50 base member; a thermostatic unit influenced by the heating coil for controlling said yielding means; and warning means including a second thermostatic element influenced by the heating coil and adapted to give an audible warning when 55 the heating coil is heated a predetermined extent and when the yielding means is released by said thermostatic unit.

6. In an electric cigar-lighter, the combination of a base member; a unit removably supported 60 by said base member and having an operative and an inoperative position thereon; a heating coil on said unit means for automatically moving the removable unit; a thermostatically controlled unit for controlling said means; a warning device; and a thermostatic element for the warning device, said thermostatic catch expanding and said thermostatic element contracting in response to the increase in temperature of the heating coil, and adapted to simultaneously release the yielding means and give an audible warning when said coil has been heated a predetermined extent.

7. An electric cigar lighter comprising a holder; an igniting unit removably supported on the 75 holder and having a heating element adapted to

be electrically connected to the holder to be brought to incandescence for use, said igniting unit being completely removable from the holder for use and having a body carrying said heating element and concealing the same from view; 5 means on the igniting unit in light conducting relation with the heating element to indicate the degree of incandescence of the heating element when being heated for use; signal means responsive to the temperature of the heating element 10 for indicating that the heating element has attained a predetermined temperature; and means, including means responsive to the temperature of the heating element, to electrically disconnect the latter from the holder when the heating element attains a predetermined temperature. 15

8. In an electric cigar lighter, the combination of a base member; a unit removably supported by said base member; a heating coil on said unit; means slidable in the base for closing a circuit to 20 energize the heating unit; means normally urging said means to open-circuit position; a thermostatic catch for holding the circuit closed and adapted to release the first-named means upon the heating element attaining its desired heat; 25 a warning device; and means operated by the thermostatic catch upon movement into release position for actuating the warning device.

9. In an electric cigar lighter, the combination of a base member; a unit removably supported by 30 said base member; a heating coil on said unit; means slidable in the base for closing a circuit to energize the heating unit; means normally urging said means into open-circuit position; a thermostatic catch for holding the circuit closed 35 and adapted to release the first-named means upon the heating element attaining its desired heat; and means for producing an audible signal, said means being operated upon movement of the thermostatic catch into release position. 40

10. In an electric cigar lighter, the combination of a base member; a unit removably supported by said base member; a heating coil on said unit; means in the base member for closing a circuit to energize the heating unit; means normally urging said means into open-circuit position; a thermostatic catch for holding the circuit closed and adapted to release the first-named means upon the heating element attaining its desired heat; and means operated in response to 45 the movement of the thermostatic catch to release position for producing an audible signal.

11. In an electric cigar lighter, the combination of a base member; a unit removably supported by said base member; a heating coil on the unit; means slidable in the base for closing the circuit to energize the heating unit; means normally urging said means into open-circuit position; a thermostatic catch for holding the circuit closed and adapted to release the first- 55 named means upon the heating element attaining its desired heat; and means actuated upon release of the thermostatic catch for producing an audible signal.

12. In an electric cigar lighter, the combination of a base member; a unit removably supported by said base member; a heating coil on said unit; means slidable in the base member for closing the circuit to energize the heating unit; means normally urging said means to open-circuit position; heat-responsive means for holding the circuit closed and adapted to release the first-named means when the heating element has attained its desired heat; and means operated by the movement of the heat-responsive means 70 75

into release position for producing an audible signal.

13. In an electric cigar lighter, the combination of a base member; a unit removably supported by said base member; a heating coil on said unit; means including a contact slideable in the base for closing a circuit to energize the heating unit; means normally urging said contact to open-circuit position; a thermostatic catch for holding the circuit closed and adapted to release the contact when the heating element has attained its desired heat; and means operable upon release of said contact by the catch for producing an audible signal.

14. In a cigar lighter, the combination of a base member; a unit removably supported by said base member; a heating coil on said unit; means slideable in the base for closing the circuit to energize the heating unit; means normally urging said means to open-circuit position; a thermostatic catch for holding the circuit closed and adapted to release the first-named means for movement into open circuit position upon the heating element attaining its desired heat; and means operated when the first-named means moves into open-circuit position for producing an audible signal.

15. In an electric cigar lighter comprising a holder; an igniting unit removably supported on the holder and having a heating element adapted to be electrically connected to the holder to be brought to incandescence for use, said igniting unit being completely removable from the holder for use and having a body carrying said heating element and concealing the same from view; means on the igniting unit in light-conducting relation with the heating element to indicate the degree of incandescence of the heating element when being heated for use; means including means responsive to the temperature of the heating element, to electrically disconnect the latter from the holder when the heating element attains a predetermined temperature; and signal means responsive to the temperature of the heating element for indicating that the heating element has attained a predetermined temperature and that the heating element is electrically disconnected from the holder.

16. In an electric cigar lighter comprising a holder; an igniting unit removably supported on the holder and having a heating element adapted to be electrically connected to the holder to be brought to incandescence for use, said igniting unit being completely removable from the holder for use and having a body carrying said heating element and concealing the same from view; means on the igniting unit in light-conducting relation with the heating element to indicate the degree of incandescence of the heating element when being heated for use; means, including means responsive to the temperature of the heating element, to electrically disconnect the latter from the holder when the heating element attains a predetermined temperature; and signal means responsive to the temperature of the heating element for indicating that the heating element has attained a predetermined temperature or that the heating element is electrically disconnected from the holder due to the operation of the heat-responsive means.

17. In an electric cigar lighter comprising a holder; an igniting unit movably mounted on the holder and completely removable therefrom for use; a heating element carried by the igniting unit and adapted to be brought to incandescence for use, the body of the igniting unit concealing the heating element from view; means for closing a circuit through the heating element when moved to circuit-closing position; means for indicating the degree of incandescence of the heating element; heat-responsive means for opening the circuit when the heating element attains its predetermined temperature; and signal means actuated when the circuit-opening means operates to indicate that the circuit is open, said means operating during the time that the circuit is in open position due to the action of the heat-responsive means to indicate that the circuit cannot be closed by the normal movement of the igniting unit into circuit-closing position.

JOSEPH H. COHEN.

Patent No. 2,117,703.

May 17, 1938.

JOSKPH H. COHEN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, second column, line 15, for "incandescence" read incandescence and for "wherup" read whereupon; line 23, for "incandescence" read incandescence; page 3, second column, line 50, for "heads" read hands; page 5, first column, line 55, claim 5, for "oil" read coil; and line 62, claim 6, after "unit" insert a semicolon; and that the said Letters Patent should be read with this correction ther-in that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2nd day of August, A. D. 1938.

(Seal)

Leslie Frazer,
Acting Commissioner of Patents.

[This Drawing is a full-size reproduction of the Original]

Fig. 1

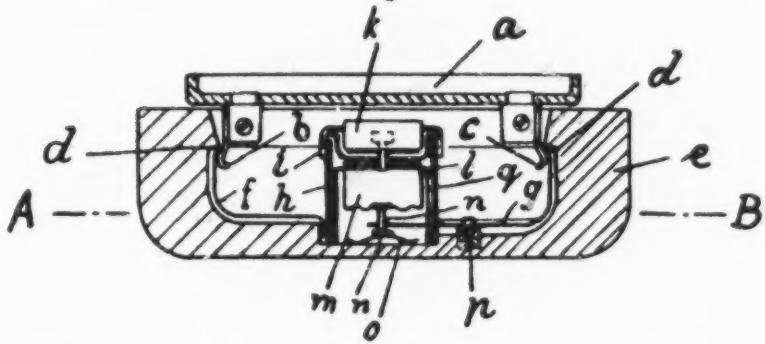
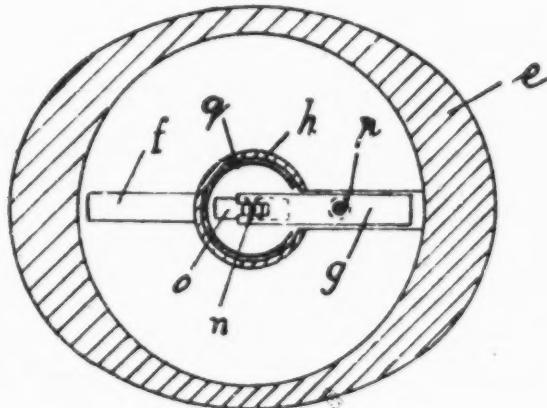
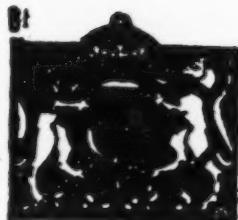


Fig. 2



PATENT SPECIFICATION



Convention Date (Germany): Oct. 1, 1927.

298,073

Application Date (In United Kingdom): Aug. 16, 1928. No. 23,630 / 28.

Complete Accepted: May 9, 1929.

COMPLETE SPECIFICATION.

Improvements in or relating to Electric Cigar-lighters.

I, ADOLF RUPPS, of German nationality, of Gartenstrasse 9, Tübingen, Germany (Assignee of ADOLF SIDLER & Co. G.M.B.H., a German Company, of Schaffhauserstrasse 69, Tübingen, Germany), do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following 10 statement:—

This invention relates to an electric cigar-lighter which is primarily intended for use in automobile vehicles. With those cigar-lighters wherein the member 15 that carries the glow body is removable from the member that carries the leads and is permanently secured to the vehicle, there is the danger of overheating the glow body even when the latter is so 20 arranged as to be visible.

In order to overcome this objection it has been proposed in specification No. 285,200 to use a cut-out device in conjunction with the electric lighter, the said 25 device comprising a thermostatically-controlled switch or make-and-break device adapted to be included in the lighter circuit.

The present invention consists in an 30 electric cigar-lighter of the character described in the specification above mentioned and in which the lighter is used in conjunction with an expansion capsule, the said capsule being resiliently pressed 35 against a contact of the glow body, and receiving heat from the latter, and the arrangement being such that in the event of the glow body becoming overheated a contact on the capsule moves out of its 40 normal electrical contact with a preferably adjustable contact member connected to one of the leads and so interrupts the circuit.

One constructional form of the invention is illustrated in the accompanying drawings, wherein

Fig. 1 shows a cigar-lighter mainly in central section and

Fig. 2 is a sectional plan on the line 50 A—B in Fig. 1.

The cigar-lighter consists of a base plate a to be secured to the wall of the vehicle, with resilient contact members b and c.

(Price, 1/-)

which are connected with the current-supply leads.

The resilient contact members b and c take up a position in an annular recess d in a hook e. In the recess d contact springs f and g are arranged opposite to one another. In the position of the parts shown they are in conducting communication with the resilient contact members b and c. The closing and opening of the circuit are effected by rotating the hood e upon the base plate a.

In a tube h connected with the hood the glow body k is arranged in a readily exchangeable manner by means of a screw cap i. One pole of the glow body is electrically connected with the screw cap i or with the tube h, with which the contact spring f is in conducting communication. The other pole of the glow body k is connected with a contact disc l.

Between this contact disc l and the other connection formed by the contact strip is arranged a thermostat, here shown as consisting of an expansion capsule m, which is connected with a contact member n. The contact strip g embraces the stylus of the contact member n with such clearance that only a collar of the contact member can come into conducting communication with the forked ends of the contact strip. To the collar of the contact member n is secured a spring o, which bears against the end wall of a cylindrical recess in the hood e, and presses the thermostat resiliently against the contact disc l and similarly presses the collar of the contact member n against the contact spring g.

The position of the forked end of the contact strip g in relation to the contact member n can be adjusted by means of a screw p. The thermostat m is electrically insulated from the tube h by an intermediate layer q. When the glow body k is heated the heat is transmitted to the thermostat m through the contact disc l. The thermostat expands, and as soon as the dimension corresponding to the limiting temperature condition of the glow body is reached, the collar of the contact member n moves out of contact with the forked end of the contact strip g and the current is interrupted.

After suitable cooling the parts then

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return to their original positions again.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An electric cigar lighter used in conjunction with a thermostatic cut-out device characterised by the feature that 10 the said cut-out device consists of an expansion capsule which is resiliently pressed against a contact of the glow body, and which receives heat from the latter,

the arrangement being such that in the event of the glow-body becoming over-heated, a contact on the capsule moves out of its normal electric contact with a preferably adjustable contact member connected to one of the leads, and so interrupts the circuit.

2. The improved electric cigar-lighter, substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 25th day of July, 1928.

MARKS & CLERK.

[fol. 533] IN UNITED STATES DISTRICT COURT, DISTRICT OF CONNECTICUT

STIPULATED EXTRACT OF FILE WRAPPERS OF MEAD, No. 1,736,-
544; COHEN, No. 2,140,311; AND COHEN, PATENT No. 2,117,232

It is hereby stipulated and agreed that the following shall be embodied in the printed record on appeal in the above cause:

The Mead patent No. 1,736,544 file wrapper, Defendant's Exhibit I, shall not be printed in the transcript of record on appeal, but shall be transmitted to the Court of Appeals as a physical exhibit, with the consent of said Court. During the prosecution of this patent the Examiner in the Patent Office cited as prior art only the prior patents to Metzger 1,622,334 and Harley 852,326 and no other prior patents, publications, uses, or other instances of prior knowledge. There was no interference with the Copeland patent 1,844,206 or application.

The file wrapper of the Cohen patent 2,140,311, Defendant's Exhibit J, shall not be printed in the transcript of record on appeal and may be transmitted to the Circuit Court of Appeals as a physical exhibit with the consent of said Court. During the prosecution of this Cohen patent in the Patent Office, the following patents were cited and no others: Metzger 1,543,290, Mead 1,736,544, Cohen 1,944,925, Ashton 2,060,783, Wolfson, et al., 1,732,-784, Copeland 1,844,206, British patent to Rupps 298,073, and Schoeller 1,570,286. An interference between this application and Ashton No. 2,084,966, was declared and dis-[fol. 534] solved by a decision of Primary Examiner on the ground that Cohen could not make the count.

It is further agreed that all of column 1, page 1, and lines 1 to 18 of column 2, page 1, of the Cohen patent 2,140,311, were inserted by an amendment of November 19, 1938, in place of the following which appeared at the beginning of the application as filed and which was cancelled:

"This invention relates to improved cigar and cigarette lighters, particularly of the types for use in automobiles.

Most lighters of this type, which have been manufactured heretofore, are so designed that it is necessary for the driver to push against a movable igniter unit or to press a switch button for an extended period of time in order to

close an electrical circuit for the purpose of heating the lighter to incandescence. However, these lighters required the driver to continuously divert his observation from the road to the cigar lighter, in order to observe when the igniting unit thereon was heated to incandescence and in condition for use, the heated wire itself serving as an indicator. Besides diverting the driver's observance of the road it necessitated his driving with only one hand while forcing the movable member of the cigar lighter or forcing a push button to circuit-closing position with his other hand over a somewhat extended period of time.

In order to overcome the latter disadvantage, some lighters have been constructed with a bayonet lock or its equivalent, which holds the removable unit of the cigar lighter in circuit-closing position so that the igniting coil would be [fol. 535] heated to incandescence without the necessity of pushing and holding the removable unit or push button switch in circuit-closing position. However, these cigar lighters, with the bayonet lock, had the marked disadvantage of keeping the circuit closed for an extended time and sometimes even dead shorting the battery of the car for so long a time that complete recharging was necessary in the event of the driver forgetting that he locked the removable igniting unit in closed-circuit condition.

With both of these types of lighters, with and without bayonet lock, which are the types most generally in use, there is a strong likelihood of keeping the circuit closed over too long a period of time; this, in addition to the hereinbefore mentioned disadvantages of requiring the operator or driver to take one hand from the wheel and hold the cigar lighter in closed-circuit condition for an extended period of time, and to divert his gaze from the road to the cigar lighter in order to ascertain when it may be lifted from the instrument panel for use.

It is an object of the present invention to provide an electric cigar lighter in which it is not necessary for the driver to divert his gaze from the road ahead nor to keep his hand away from the wheel for any considerable extent of time, the elimination of which makes for greater safety while driving the car.

It is a further object of the present invention to provide a cigar lighter which will be maintained in closed-circuit condition just long enough to heat the igniting coil to

incandescence, and with no danger of an excessive drain on the battery.

In its broader aspects the present invention provides a [fol. 536] cigar lighter wherein it is merely necessary for the driver to move the same in one direction, whereupon the circuit to the igniting coil will be closed and the igniting unit will be automatically held in closed-circuit position until the igniting coil is heated to incandescence whereupon the circuit will be broken automatically so that there is no further drain upon the battery, thus, minimizing the skill, care, and effort on the part of the driver.

A feature of the present invention is the provision of means for closing the circuit to the lighter in order to improve the thermal condition of the lighter even though the regular thermally responsive circuit-closing contacts are still in the thermally separated and circuit-opening position."

Claim 3 of Cohen 2,140,311 was originally presented and was allowed as filed. Claim 20 (former 40) was added by the amendment of Sept. 28, 1938, and concerning it and the other claims added at the same time Cohen said by his attorney, Arthur A. Johnson:

" * * * These claims are drawn, in varying scope, to a cigar lighter having two separate parts, one a holding device and the other an igniting unit; with one of said parts having a normally open, manually operated switch completely carried thereby and having a pair of contacts which when moved together are held together until a heat-responsive means associated therewith releases the holding means.

As was pointed out some months ago at the interview granted by the Primary Examiner and the Assistant Examiner in charge of this case, the placing of the complete [fol. 537] switch with the holding and release means on one part is a valuable and important feature of Applicant's invention. This construction does away with the necessity of matching of the two parts which is a tedious and expensive operation.

Also, the construction permits the igniting unit to be used with any of several holding devices so that a replacement of damaged or pilfered parts can be made without requiring the whole device to be dismantled and ad-

justed or matched in order to again have an efficient lighter.

The factor of replacing pilfered parts is quite important where the devices are installed as standard equipment on automobiles on the assembly lines. When matched parts are required the two parts are installed as a unit and must be maintained as a unit. Now, the igniting unit is small and can be very easily removed from the holding device and secreted on the person so that by the time a car is to be delivered its igniting units may be missing, thus requiring that a new lighter with a matched holder and igniter be installed in the car. With the device of the present invention, inasmuch as the holding device and igniting units do not have to be matched, the holding devices alone can be installed on the assembly line and an igniting unit inserted on delivery of the car to the customer.

At the time the present invention was made, the only known electric cigar lighter of the separable type having an automatic control for the circuit was that disclosed in Mead. This patent, however, has part of the switch on the removable member and part on the stationary member so that the two parts must be matched to obtain efficient [fol. 538] results, and when once matched the two parts thereof cannot be interchanged with like parts of other lighters and obtain the same efficient results. Applicant's contribution is clearly an advance over the construction shown in the Mead patent."

At the same time, said Arthur A. Johnson made affidavit as follows in said application:

"I am informed as to the construction and operation of electric cigar lighters for automobiles now being offered to trade by several manufacturers, including Casco Products Corporation, licensee under the above entitled application. The construction of the thermostatically controlled cigar lighter of the manufacture of Casco Products Corporation is of the type described in the Cohen patent 2,117,232, manufactured under the patent to Mead 1,736,544, under license of Automatic Devices Corporation. In this type of cigar lighter, when the heating element is heated for use, heat responsive means on the holder of the cigar lighter, which elastically engages a portion of the igniting unit, gradually releases its clasp and permits the igniting unit to be returned to open circuit position by a spring. The relation between the heat responsive means and the engaged

portion of the igniting unit and the tension of the spring which moves the igniting unit to open circuit position and which is carried by the igniting unit is critical, for if the igniting unit is released too easily, or the spring is too strong, the heating element may not be as hot as desired for use. If the igniting unit is released too hard, or the spring is too weak, the heating element may be overheated. [fol. 539] The tension of a circuit opening spring and the tension of the heat responsive means must be carefully adjusted, one against the other. Since the circuit opening spring is on the igniting unit and the heat responsive means is on the holding device, best results can be had only by keeping these parts in adjusted matched sets.

When cigar lighters are installed as standard equipment on automobiles, I am informed and believe that it is not uncommon that the igniting units disappear from the holding devices during the assembly of the car, either because they are knocked out or fall out of the holder, or because they are stolen. It is preferable, therefore, that the holder alone be mounted on the car while on the assembly line, or during shipment. Yet where the means for automatically opening the circuit is carried jointly by the holder and the igniter, it is impracticable, for the reasons stated above, to separate the matched pair of parts.

With the invention of the above entitled application, however, this problem is solved because the holder and igniter need not be matched one against the other. The means for opening the circuit automatically is carried entirely by one of the parts, the holder in the form of the invention shown in the above entitled application."

On October 1, 1938, claim 20 of this Cohen patent 2,140,311 was amended by inserting:

"in heat-receiving relation with said heating element" after "heat responsive means." (See lines 40 to 42 column 2, page 6 of the patent.)

[fol. 540] Concerning this amendment Cohen by his attorney, Arthur A. Johnson, said in the record as to an interview with the Examiner:

" * * * and it was agreed that the invention defined by these claims was different from these references inasmuch as a new and improved result was obtained by having

all of the normally open, manually closed, thermostatically-controlled switch carried by one of the members for the reasons fully stated in the remarks to said amendment which are supported by an affidavit attached thereto. At the interview the Examiner raised the question that the combination of Copeland's switch (Fig. 6) (it being agreed that the form of the invention shown in Fig. 2 was not pertinent to this combination), might meet the terms of the claims when combined in the circuit with any wireless type lighter as, for example, Metzger, No. 1,543,290, or Schoeller No. 1,570,286. After much consideration, it was agreed that if these claims were amended to bring out that the heat-responsive means was in heat-receiving relation with the heating element, or that the switch was moved to closed-circuit position by manual engagement of a portion of the igniting unit accessible while the igniting unit is supported by the holder, that the claims would then clearly distinguish from such a combination, and be patentable to Applicant."

Claim 20 (former 40) was again rejected October 12, 1938, because (as stated by the Examiner):

"lacking patentability over each of Cohen and Wolfson, et al. In view of Mead it would be obvious and unpatentable [fol. 541] broadly to provide a thermostatic means to hold the parts of any 'wireless' lighter in circuit closing relationship."

In the amendment of October 20, 1938, the same claim was again amended by inserting after the previous amendment to this claim:

"coaxial with the heating element and the movable members."

and applicant Cohen said by his attorney

" * * * * in the Wolfson patent there is a switch comprising two parts on the igniting unit, but in the Mead patent with which these other two are combined by the Examiner, one part of the switch is on the holder and the other part is on the igniting unit. In any legitimate combination of these references, following the teachings of Mead, the switch must be kept closed by a cooperative engagement between the igniting unit and the holding device."

"the big advance which applicant made over Mead was the provision, on one of the two separable and removable parts of the cigar lighter, of the automatic heat-responsive switch so that the need for matching of the holding device with the igniting unit is obviated. * * *

All this is avoided by the present invention, in the specific embodiment shown, by mounting the switch with its two relatively movable contacts, detent means, urging means, and heat-responsive means so as to be carried en-[fol. 542] tirely by solely one and the same of the two parts of the cigar lighter.

Accordingly, each of the above enumerated claims has been amended to bring out that these parts referred to in the claims are carried entirely and solely by one and the same of the two parts. * * *

Following the teaching of Mead, the mechanic would have to arrange for holding the Wolfson button depressed by a latch on the holding device, * * *.

It is respectfully submitted that there is no justification in either Cohen, Wolfson, or Mead for holding that it lacks invention to hold the two parts of the switch in Cohen together by a thermostatic latch, or the two parts of the switch in Wolfson together by a similar latch with the latch being carried by the part carrying the switch. * * *"

In the amendment of November 15, 1938, claim 20 (former 40) was again amended by canceling the last three lines of the former claim and substituting in place thereof:

"heat-responsive means in heat-receiving relation with said heating element, coaxial with the heating element and coaxial with the movable members, said heat-responsive means holding the movable members in circuit-closing position until the heating element has attained its desired usable heat."

Defendant's Exhibit K, the file wrapper of the Cohen patent 2,117,232 shall not be printed in the transcript on appeal but shall be transmitted as a physical exhibit with the consent of the Circuit Court of Appeals.

[fol. 543] During the prosecution of the Cohen patent 2,117,232 the prior art cited by the Examiner included Adams 1,373,583, Morris 1,376,154, Langos 1,697,686, Mead 1,736,544, and Mahan 1,757,255, and Rintels 1,940,463 was mentioned, but no other prior art was cited.

Claims 1, 2 (former 4) and 10 (former 16) were rejected for

"* * * lack of invention over each of Langos and Mahan. In view of Mead it would not amount to invention to provide a thermostatic contact-detent for holding the units of the references in circuit-closing position and releasing them to open-circuit position after a predetermined heating period. The necessary mechanical changes for applying the teaching of Mead to such lighters would be obvious to any skilled mechanic. Whether one or both of the contacts be free of the socket contacts in inoperative position is clearly a matter of choice, both being obvious alternative arrangements."

These claims were further rejected in the first action for

"lack of invention over Mead. In view of Langos or Mahan, it would be an obvious change to make the unit movable longitudinally, into open- or closed-circuit positions merely by changing the position of the detent-contact to hold the unit in 'in' position and providing a spring for moving it to 'out' position."

By the amendment of February 3, 1934, claims 1 and 2 of this patent were amended by removing the word "movable" and substituting slideable. Claim 1 was also amended [fol. 544] at this same time by inserting the word "releasably" after "and", and the following remarks were made:

"Reconsideration of the rejection of claim 1 for lack of invention over Langos, is asked. While Langos has a spring finger 9 which rides up on the side of an annular groove and urges the heating element outwardly of the socket, there is, however, no spring detent to catch the igniting unit and hold it in its circuit-closing position in the socket. To provide a spring detent for this function would defeat Langos' purpose, for he sought to make it impossible for the igniting unit to remain deep in the socket when it is released from hand engagement. Applicant appears to be the first to do this for any purpose, and accordingly it is submitted that it is not necessary for the claim to state how the heating element is released. The claim has been amended to specify that the spring detent catches and releasably holds the igniting unit deep in the socket."

The same remarks were said to apply to Claims 2 and 10 of the patent.

In the action of May 24, 1934, the Examiner said:

"The rejections of the last office action are repeated. Claims 1, 4, 9, 10, 11, 13, 15, 16, 17 and 19 are further rejected for lack of invention over each of Adams and Morris, whose igniters are normally in shallow and inoperative positions and are adapted to be moved, against the force of spring means, into operative (deep) positions. [fol. 545] In view of Mead it would not amount to invention (1) to equip any igniter with a thermostatic latch for holding the device in circuit-closing position until the igniter is heated, (2) to make said latch one of the electrical contacts, and (3) to substitute a resistance coil for any other type of resistor. The application of the teachings of Mead to the structures of the new references would involve no more than average mechanical skill. It is merely a matter of choice whether the thermostat be heated by (1) the current flowing through the circuit, (2) the heat from the resistor, or (3) both. It is usual practice to make thermostats adjustable. The claims are entirely too broad in view of the art."

In the amendment of November 21st, 1934, claim 1 had the following phrase added at the end of the claim:

"and as a result of said longitudinal movement of the igniting unit to said operative position."

By the same amendment claim 2 (former 4) had the word "open" cancelled in line 9 and in place thereof was substituted—"release said plug". At the end of this claim was added—

"said catch being rendered operative as a result of the longitudinal movement of the igniting unit into said operative position."

Claim 10 (former 16) by the same amendment had the word "coil" cancelled and in place thereof the word "element" was substituted.

Cohen said concerning claims 1 and 2 of the patent:

"Claim 1 has been amended to make it clear that the catch becomes operative as a result of the longitudinal [fol. 546] movement of the igniting unit into operative position. In Morris and Adams, there is no spring detent or anything at all to hold the igniter in energizing position.

In Mead also, there is no spring detent for holding the igniting unit against longitudinal movement but merely to hold it against rotation. Therefore, it is submitted, no proper combination of Morris or Adams and Mead would produce the structure claimed, especially since the claim now specifies that the detent is made operative as a result of the longitudinal movement of the igniting unit to operative position."

Concerning claim 10 of the patent it was said:

"These claims call for the bimetallic detent to be in close proximity to the heater element. In this way, the device is made very responsive and certain in its action. The idea is totally lacking in Mead."

In the argument of August 21st, 1935, claims 1 and 2 of the patent were not changed and Cohen said concerning claims 1 and 2:

"Reconsideration of the rejection of claim 1 is asked. This claim covers Applicant's novel construction in which a spring detent is employed to releasably hold the igniting unit deep in the socket in operative position against the means tending to release it."

In claim 10 of the patent "convection" was changed to "conduction" at this time.

[fol. 547] As to claim 10 of this patent Cohen said:

"The claims were intended to bring out that the heating element is in close proximity to the bimetallic contact spring by radiation and conduction. In Mead, the thermostatic member is only heated by radiation or convection, and is not in close proximity to the heating element."

In the amendment of May 23rd, 1936, claim 1 was amended by inserting the word "manually" after "longitudinally" (see line 35 of page 3 of the patent). This same claim in the same line, the word "from" was substituted for the word "into", and in the next line "to a" was inserted in place of "and".

At the same time claim 2 of the patent (former 4) was amended by having the word "manually" inserted in line 57 of page 3 of the patent.

Concerning claims 1 and 2, Cohen said:

"* * * recite that the longitudinally slideable unit is manually to be sent from shallow inoperative position to

deep operative position, are again submitted, with a request that the rejection thereof be reconsidered."

Claim 16 of the patent (former 22) was said to be distinguished along the line of claim 1.

Claim 1 was amended April 10th, 1937, by inserting—

"cooperating contacts on the igniting unit and the base member respectively adapted to engage when the igniting unit is in said deep operative position and disengage when [fol. 548] in said shallow inoperative position, said contacts being maintained in good electrical engagement by the tendency of the igniting unit to move toward inoperative position."

This insert was subsequently cancelled in the amendment of September 25th, 1937.

In the April 10th, 1937, amendment claim 2 (former 4) had the following inserted:

"cooperating contacts on the igniting unit and the base member respectively adapted to engage when the igniting unit is in said deep operative position and disengage when in said shallow inoperative position, said contacts being maintained in good electrical engagement by the tendency of the igniting unit to move toward inoperative position."

This insert was cancelled by the amendment of September 25th, 1937.

Claim 16 of the patent (former 22) had the following insertion made:

"a heating element carried by said igniting unit; cooperating contacts on the base and igniting unit respectively for energizing said heating element only when the igniting unit is in said deep operative position."

This insert was cancelled by the amendment of September 25th, 1937. At the same time this claim had the following also inserted into it:

"and deenergizing the heating element, said forcing means by tending to move the igniting unit toward shallow position causing said cooperating contacts to maintain good electrical engagement when the igniting unit is in energizing position."

Claim 18 of the patent (former 26) was added by the amendment of April 10, 1937.

The amendment to claim 1 inserted April 10, 1937, was cancelled September 25, 1937, and in place thereof the following was inserted:

"cooperating contacts on the igniting unit and the base member respectively, adapted to engage when the igniting unit is in said deep operable position and disengage when in said shallow inoperative position, one of the contacts on the base member extending into the path of movement of one of the contacts on the igniting unit so that said contacts are maintained in good electrical engagement by the tendency of the igniting unit to move toward inoperative position."

The aforementioned insert in claim 16 of the patent (former 22) added by the amendment of April 10, 1937, and cancelled by the amendment of September 25, 1937, had the following substituted in place thereof:

"a heating element carried by said igniting unit; cooperating contacts on the base and igniting unit respectively for energizing said heating element only when the igniting unit is in said deep operative position, one of the contacts on the base member extending into the path of movement of one of the contacts on the igniting unit."

[fol. 550] In the argument of September 25th, 1937, Cohen said by his attorney concerning claims 1, 2 and 16 of the patent (former 1, 4 and 22) that these claims

"have been amended to bring out the relation of the contacts as agreed upon at the recent interview courteously granted the attorney for the Applicant by the Examiner in charge of this application. It was stated at the interview that such amendments would remove any question of indefiniteness and functionality from the claims."

James T. Kline, George F. Smyth, Attorneys for Plaintiff, 945 Main Street, Bridgeport, Conn.
R. S. Allyn, Counsel for Defendant.

Dated: August 21, 1940.

[fol. 551] IN DISTRICT COURT OF THE UNITED STATES, DISTRICT OF CONNECTICUT

Civil Action No. 97

THE AUTOMATIC DEVICES CORPORATION,

v.

THE CUNO ENGINEERING CORPORATION

FINDINGS OF FACT AND CONCLUSIONS OF LAW

1. Plaintiff is a corporation of Connecticut. It is a patent holding company and does not manufacture or sell cigar lighters. Defendant is a Connecticut Corporation located in Meriden, Connecticut, where it has long been engaged in the manufacture and sale of cigar lighters. The expense of this action is being borne by plaintiff's licensee, Casco Products Corporation, also a Connecticut corporation.

2. This is an action under the patent laws for infringement of claims 1, 2, 3 and 11 of the Mead patent 1,736,544 filed August 24, 1927, dated November 19, 1929 for Cigar Lighter, transferred by mesne assignments to plaintiff February 6, 1936. Infringement is also urged of claims 3 and 20 of the Cohen patent 2,140,311 dated December 13, 1938 for Cigar Lighter, filed January 2, 1937, as an alleged division of Cohen patent 2,117,703 filed July 23, 1932, and issued to plaintiff. Also infringement is urged of claims 1, 2, 10, 16 and 18 of the Cohen patent 2,117,232 dated May 10, 1938 for Cigar Lighter, filed March 29, 1933 and issued to plaintiff.

3. The defendant's device, accused of infringement, described with the aid of numerical references drawn from [fol. 552] Exhibits 1A to 1C, consists of two main parts, viz., socket and plug.

(a) The socket is a subcombination comprising a metallic cylinder 10 adapted to be inserted through the instrument panel 14 of an automobile. From the rear end of the socket protrudes a stud 11 carrying a rod 12 which connects the inside and outside of the socket. To the outer end of the

rod 12 is attached a current supply wire. The inner end of said rod carries three bimetallic fingers 16 which, by their co-operation with the flange 35 of the "movable" plug hereinafter described, constitute the latch of the device also serving as live contacts. In the base of the socket are three rigid, spaced, base contact abutments 17, against which the cup 28 of the "fixed" plug rests when the movable plug is in both closed-circuit and open-circuit positions.

(b) Associated with the socket, as above described, are other parts including a clamping member 15 which in co-operation with a flange on the outer end of the socket serves to clamp the socket to the panel of the automobile. But except for this clamping function, these associated parts of the socket are not in co-operative relationship with the socket, or indeed with the plug.

(c) The plug consists of two relatively movable sub-combinations, one of which (hereinafter referred to as the "fixed" plug) is carried on the sleeve 18, and the other of which (hereinafter referred to as the "movable" plug) is carried on sleeve 19. The sleeve 18 comprises a tube of insulating material which carries at its inner end (inner with respect to the socket member) a metal sleeve 23 having spoke-like arms 24 joined at the center and carrying a cylindrical block 25. The inner end of the block 25 is en-[fol. 553] gaged by a screw 26 which carries the heating element comprised of the igniter coil 27. The inner convolution of the igniter coil is received in a slot in the head of the screw 26 and the outer convolution of the igniter coil is connected to the cup 28 which surrounds the igniter coil. When the plug is inserted in the socket, the insulating tube 18 slides along and is guided by the inner wall 10 of the socket until the igniter cup 28 abuts against the base contacts 17 of the socket. This is the carrying or open-circuit position of the fixed plug; also its operative or closed-circuit position.

(d) The movable plug consists of the metal sleeve 19 which is mounted slidably in the interior of the sleeve 23. The sleeve 19 has at its outer edge (outer with respect to the socket) an end wall 20 carrying a stud 21 to which is secured an insulating disc and screw 21 (a) on which the knob 22 is threaded. The sleeve 19 at its inner end is shaped into a contact flange 35 adapted to engage and be

retained by the bimetallic latch fingers 16 of the socket. With the entire plug in carrying or open-circuit position, the movable plug can be manually pushed inward by pressure on the knob 22 until the flange 35 of the sleeve 19 is engaged by the bimetallic fingers 16 of the socket, thus closing the circuit.

(e) There is a coil spring 34 interposed between the spoke-like arms 24 of the sleeve 23 in the fixed plug and the end plate 20 of the sleeve 19 in the movable plug. The movement of the movable plug from carrying to operative position is accomplished against the pressure of this spring, as a result of which the contact cup 28 is held under spring pressure against the butts of the socket as long as the bimetallic fingers 16 in the socket hold the flange 35 of the fixed plug in engagement. When by convection and radiation [fol. 554] (but not by conduction) the bimetallic fingers of the socket are spread apart after the igniter coil has been heated to incandescence, the spring 34 returns the movable plug to carrying position with the circuit open, the entire plug fixed and movable being then ready for removable application.

4. (a) Hammarstrom, 493,380 (application 1892) showed a "combined Cut-out and Lightning-arrester" by introducing into a line of electrical current a bimetallic member and a latch so arranged that "a strong electric current" would expand the bimetallic part, apparently from the heat generated by the current through the bimetallic part, thus releasing the latch member and breaking the circuit. The invention was apparently primarily directed to the protection of telegraph circuits from the onslaught of a lightning bolt.

(b) Denhard, 1,143,572 (application August 31, 1910), disclosed a means for thermostatic control for electric heaters, with particular reference to electric flat-irons. The thermostatic means disclosed contained no parts having coaxial characteristics or any peculiar adaptability to a socket or cylindrical member; nor did the disclosure include any such socket member in its combination. He did, however, disclose as current-breaking means bimetallic strips, responsive to the temperature of the working base of the flat-iron, in co-operation with a latch, which holds the device in closed-circuit position until a predetermined temperature of the iron is attained.

(c) Stahl 1,372,207 (application 1919) illustrates a construction in which the bimetallic element of a thermostatic switch functions directly as the latch, as is also the case in Hammarstrom 493,380.

[fol. 555] (d) Morris 1,376,154 (application 1919) shows a wireless cigar lighter having as an alternative form a semi-automatic feature whereby the plug is held in the open-circuit or carrying position by a spring in the socket. To close the circuit, the entire plug is manually pressed inwardly. It is manually held in this position by the operator against the tension of the spring during the entire heating up period of the igniter coil. Whenever the operator releases the manual pressure on the plug, the spring returns the plug to its normal open-circuit position. There is no thermostatic control in the Morris patent.

(e) Zecchini, 1,437,701 (application April 15, 1921) is an example of prior art showing that a coaxial relationship between the parts was the usual arrangement in the conventional plug and socket type of lighter.

(f) Copeland, 1,844,206 (application April 18, 1927) disclosed in a lighter socket thermostatic means, consisting of parts in coaxial relationship, acting as an automatic means to break the circuit in response to the temperature of a resistance element. This resistance element did not itself serve as an igniter; rather it served to break the circuit after the lapse of time sufficient to accomplish the incandescence of the igniter and the lighting of a cigar. Copeland showed no plug; rather he contemplated that a cigar should serve as a plug; that the manual insertion of the cigar into the socket should close the circuit and thus start the lighting process.

(g) Cohen, 1,944,925 (application April 22, 1929) shows a plug and socket lighter with complete switch-mechanism in the socket. His plug was adapted automatically to break the circuit upon the release of manual pressure on its knob. [fol. 556] All the essential parts are in coaxial relationship with each other. Devices made under this disclosure were in use for two years prior to the two Cohen patents in suit. This patent shows no thermal control.

(h) Wolfson, 1,980,157 (application April 10, 1931) showed a plug and socket lighter, in which all essential

parts were in coaxial relationship to each other, with the plug carrying a spring effective, under the arrangement disclosed, by pressure on a fixed part of the plug to push the movable part thereof carrying the heater unit into a normal carrying or open-circuit position with the heater unit out of contact with the metallic contact fingers of the socket. The contact fingers of the socket, however, lacked the function of latching and the function of unlatching in response to heat.

Conclusions of Law

Mead

5. Claim 1 is not infringed.

Comment

Claim 1 covers a combination purporting to have two main subcombinations, viz., (1) a removable plug, and (2) a "base member". But the base member disclosed in the patent is not the conventional simple socket well-known in the electrical art. It is a complex combination in itself which amongst other features serves as a mounting for a movable rotating socket 41. And claim 1 definitely includes this rotating socket as one of the elements of its subcombination when it refers to "means on said base member for moving said plug to an energizing position in which said coil is energized."

[fol. 557] It is not sensible to direct this reference, as plaintiff would have me do, to the knob on the plug. For the knob of the plug no more co-operates with the movement of the plug than the handle of a hammer with its head. Clearly the quoted reference is directed to the socket which guides the plug in its longitudinal and rotary movements.

The defendant's device does not include the complex base member disclosed by the patent. In the defendant's device the socket does not move at all (nor the fixed plug either) when the movable plug moves from carrying to closed-circuit position. The defendant has utilized a socket which performs all the useful functions which in the disclosure of the patent are accomplished by a plurality of elements including the socket 41 and its associated parts plus the base member 34 and its bracket 37 and other associated

parts. As a result the defendant's device involves only a simplified co-operation between plug and socket members instead of the complex co-operation which Mead provided betwixt plug, socket and base members.

Mead

6. Claim 2 is not infringed.

Comment

This conclusion turns upon a proper construction of the claim, and I turn forthwith to that task.

Claim 2 states a combination composed of three main sub-combinations. The first subcombination is the plug. The only unusual feature of Mead's plug which could possibly be considered as a contribution to a genuine invention is the rotary contact pin 75 which protrudes through a slot in the socket. The second subcombination is the socket. The only unusual feature of the socket is the fact that it is rotatably mounted upon the third combination, a base member, thereby deriving rotary movement in one direction [fol. 558] through manual pressure on the plug and in the other direction through the force of a spring.

The third subcombination is indicated by that language of the claim which says "means responsive to the temperature of said heating unit for interrupting said heating circuit." The patent discloses as the interrupting means certain bimetallic parts 54, acting in co-operation with a spring 47 which may or may not be bimetallic. But it is not enough for the patent to specify the elementary parts. For the combination claim to have validity, the patent must also disclose how the separate parts may be given the capacity for mechanical and electrical co-operation; without this disclosure no operative device or combination has been shown.

In order to teach how his chosen parts might be brought into co-operative relationship, Mead showed his thermostatic means 57 mounted on a bracket of the base-member, which constitutes the third subcombination of the claim. There is utterly nothing in the specifications to suggest that the inventor himself knew how to work the necessary parts of the aggregate combination into two subcombinations, plug and socket; his only solution of the problem

of introducing into the familiar plug-and-socket combination a thermostatic current breaker involved the use of an additional subcombination, viz., the base-member. The specifications call for a base-member as an indispensable element; there is nothing to show that the base-member was an optional or preferred arrangement, indeed no substitute arrangement was disclosed.

It is true, of course, that claim 2, unlike claim 1, does not expressly call for a base-member. But the claim would be void for indefiniteness if its call for thermostatic means were not deemed to include the base-member on which the thermostatic means is mounted and through which alone [fol. 559] the thermostatic means can co-operate with plug and socket.

Moreover, in view of the prior art in the field of manually portable electrical devices, the claims in suit to avoid invalidity must be narrowly construed. In view of such prior art as Zecchini, Hammarstrom and Denhard, Mead's success, whether attributable to genuine invention or to mechanical skill, in working out an arrangement whereby latching means subject to thermostatic control (old in themselves) might be brought into co-operation with the socket and plug parts of an electric lighter (also old in themselves) must be limited to the means used. Thus Mead's invention, if any, must be limited to the three-fold combination which was his only solution of the problem. Cf. Automatic Devices v. Sinko Tool, 45 U. S. P. Q., 394, C. C. A., 7th Circ., April 27, 1940.

Thus viewed, the accused device does not infringe. It does not use the unusual features of Mead's plug and socket members adverted to above. It does not use Mead's base-member which, as just pointed out, is impliedly a part of claim 2, if the claim has validity. It does not follow Mead's arrangement of a three-fold combination. Instead, it performs every function of Mead's disclosure by a simplified and improved arrangement of two sub-combinations only, as against Mead's three. The monopoly of the patent may not be invoked thus to throttle the development of the art.

The plaintiff suggests that in the accused device there are parts associated with the socket which in effect constitute a base member equivalent to that of Mead. I cannot agree. The parts referred to (Par. 3b, supra) co-

operate with the socket as a clamping means; they co-operate neither with the socket nor with the plug in the operation of the device. In Mead, however, the base-member carries outside the socket a subcombination which [fol. 560] includes latching and unlatching means; and this latching subcombination in the operation of the disclosed device is in active mechanical co-operation with the subcombination of his socket; also with the subcombination of his plug.

Nor can it properly be contended that the accused device, like Mead, utilizes a three-fold combination, the only essential difference being that the accused device has made two subcombinations of the plug (fixed and movable), whereas Mead's base-member comprised two subcombinations (thermostatic control and socket). For the fixed plug of the accused device co-operates with the socket only as a holding means. In the function of operation, the fixed plug moves not at all; its mechanical relation to the socket is precisely the same when the current is open as when closed. The only active, direct co-operation which serves to make and break the current is between the movable plug and the socket. This is a simple one-way form of co-operation, as distinguished from the complex two-way co-operation of Mead. And in utilizing this switch-like push button type of plug, the defendant has followed Zecchini rather than Mead. Cf. Automatic Devices v. Sinka, *supra*, where it was said: "a mere longitudinal movement of the defendant's push button in the center of his plug, after the plug has come to rest and the contacts are all made, is not the equivalent of moving the entire plug in order to close the circuit."

Mead

7. Claim 3 is not infringed.

Comment

Like claim 2, this claim also does not specifically mention the base-member as an element of its claimed combination. But, like claim 2, it calls for thermostatic means [fol. 561] which so far as the disclosure of the patent goes are a part of the base-member and can co-operate with the plug in socket only with the aid of the base-member.

Mead**8. Claim 11 is not infringed.****Comment**

This claim resembles claim 1 rather than claims 2 and 3 in that it expressly calls for three subcombinations; the base-member as well as the plug and socket members are specifically incorporated into the claimed combination.

The accused device, as we have seen, calls for a simplified structure in which all the co-operative parts are compressed into plug and socket members, thus dispensing with the base-member as a co-operating part essential to the entire combination.

Cohen No. 2,140,311

9. Claim 3 is invalid for lack of patentable invention.**Comment**

At first glance, claim 3 would seem to follow Mead's disclosure in calling for a "base-member" as a third subcombination in addition to the plug and socket. But the specifications make it plain that the base-member called for by claim 1 is not a part in mechanical co-operation with the socket member; rather it is merely a flange on the end of the socket, not independently in mechanical co-operation with the socket or other parts.

It results that the validity of this claim depends, not upon the introduction of a new subcombination with a new function [fol. 562] into co-operation with conventional plug and socket combinations, as in the Mead claims discussed above, but rather upon the expansion of the conventional plug and socket members well-known to the prior art to include specified thermostatic control.

I have been shown no complete counterpart of Cohen's disclosure in the prior art. But enough of the prior art has been shown to convince me that claim 3 lacks patentable invention.

The plaintiff says the gist of the invention here claimed is "the disposition of the bimetallic fingers within the socket in coaxial alignment with the plug".

This contention closely resembles that advanced by the plaintiff with respect to the first Meuer patent litigated in

Cutler-Hammer v. Carling Tool & Machine Co., 3 Fed. Supp. 150. I there held that a coplanar relationship between the parts of an electric switch whereby the inventor obtained a minimum "dimension axially of the rotating element" was a matter of design rather than invention. This holding was upheld on appeal. 63 Fed. (2nd) 998. So here I must hold that it was not beyond the field of skill in design for Cohen to work the latching and unlatching elements of Mead into plug and socket where more compactly disposed in coaxial relationship they would still perform the same function.

Moreover, as appears in Paragraph 4 above, Copeland disclosed thermostatic means in a socket, the thermostatic parts being coaxial with the socket. Claim 3, to be sure, calls for thermostatic means responsive to the temperature of the heating coil, and Copeland's thermostatic means were responsive, not directly to the heating coil, but rather to the heat of a resistance element operating upon a bimetallic bar or circuit-breaker. But Denhard, long before, had disclosed a bimetallic circuit-breaker which was responsive to the temperature of the working surface of his device. And it [fol. 563] required no invention for Cohen to make his bimetallic members responsive to the temperature of the working surface of his device, which happened to be the heating coil. And of course it required no invention, in view of the non-automatic prior art, for Cohen to put his heating coil or "working surface" on the inner end of a plug removably mounted in the socket.

Claim 3 calls for a thermostatic means which shall not only co-operate in the circuit breaking function, but shall also function as a latching means to hold the combination in closed-circuit position until the required heat has accumulated. Denhard showed a latching means in co-operation with circuit-breaking means. Also Mead.

It might perhaps be urged that to sustain its validity claim 3 should be narrowly construed so as to call for a combination which included thermostatic means consisting of bimetallic parts which themselves served both to latch and through their heat-responsive qualities to unlatch. But Hammarstrom showed broadly this two-fold function of bimetal, and I must hold that it involved no invention over Mead to work such a feature into a plug and socket lighter. For when Mead showed a latch 52 and 53, held in latching position (Fig. 14) by a bimetal spring 54 (see Fig. 16), surely it involved no invention with the aid of Ham-

marstrom and Stahl to substitute bimetal for the actual latching piece 53. And that is the essence of the Cohen claim now under consideration.

There is, I think, no contention that features of claim 3, other than those discussed above, involved invention.

10. Claim 20 is void for lack of patentable invention.

[fol. 564]	Comment
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Plaintiff says:

"The gist of this claim is the relative movement of contact carrying members in one of the two main parts of the cigar lighter (the holding device or the igniter unit) as a result of which the circuit may be manually closed and then automatically opened by the joint action of the returning spring and bimetallic latch fingers engaging one of the contacts of the relatively movable members (and coaxial therewith and with the igniter coil) when the bimetallic fingers are heated by the heat produced by the igniter coil carried by the plug."

Certainly the relative movement of contact carrying members in one of the two main parts of the lighter involved no invention over Cohen, 1,944,925. In other respects, the claim shows no more patentable invention than claim 3. Altogether it discloses only a rearrangement of old parts within the range of mechanical skill. Cf. Automatic Devices v. Sinko, *supra*.

Cohen No. 2,117,232

11. Claim 1 is invalid for lack of patentable invention.

The plaintiff says:

"The gist of this claim is the latching in of the movable part of the igniting unit in deep operative position and so forming the latch means that the tension of the withdrawing spring serves to maintain the contacts in good electrical engagement."

[fol. 565] As to this, I cannot perceive that Cohen showed patentable invention over Mead who used spring pressure to maintain a steady electrical contact between a pin and latch member. All Cohen has done in this respect has been

to translate Mead's rotary movement to a longitudinal movement. Nor did it involve invention, in view of Hammarstrom and Mead, to substitute for the contact fingers of Wolfson, 1,980,157, a bimetallic latch.

12. Claims 2 and 16 are invalid for lack of patentable invention.

Comment

These claims are summarized by the plaintiff thus:

"These claims are similar to claim 1, but further provide that the detent fingers are thermally responsive."

As to this, as my comment under Paragraph 9 above indicates, the use of the bimetal for the two-fold function of latching by a spring lock and unlatching through the action of heat on bimetal involved no patentable invention over Hammarstrom and Mead, both of whom also showed a latch which served also as a contact member.

13. Claims 10 and 18 are invalid for lack of patentable invention.

Comment

The plaintiff's summary of these claims is as follows:

"The gist of these claims is the provision of the combined contact and catch made of bimetal and adapted to [fol. 566] engage and hold the circuit closing contact of the igniter unit, and the location of it in close proximity to the igniter coil so that it quickly responds to the heat of the latter. This is precisely what is found in defendant's device."

Thus viewed, the claim states no more than a rearrangement of claim 2 whereby the bimetallic latch is specifically located in close proximity to the heater element. Surely this additional feature was a matter of design rather than invention.

General Comment

Undoubtedly the inventor who first devised the use of bimetal as an automatic circuit-breaker in electrical devices deserved well of the human race. The record before me

suggests that Hammarstrom was perhaps that man; certainly neither Mead nor Cohen.

I have little doubt that the inventor who first succeeded in applying a bimetallic circuit breaker to a portable electrical heating device made the contribution of a true inventor to society. Perhaps on this record Denhard was the man.

But after the bimetallic circuit breaker had been introduced into a variety of electrical appliances such as flat-irons, coffee pots, etc., and after the electric cigar lighter had progressed through the reel stage to the wireless type of plug and socket device and the wireless type had progressed from the open face to the inverted face type, and the inverted face type had acquired semi-automatic features which held the plug in open-circuit position in the absence of manual pressure, the room for future invention in this class of electric lighter was strictly limited. I have serious doubt whether Mead transcended the realm of design; [fol. 567] whether in essence he did more than produce a new design for old parts having familiar functions, arranging for the co-operation of the several parts by means thoroughly familiar to one skilled in the general art of portable electrical appliances. But in any event, it is clear to me that if Mead's disclosure involved invention the only inherent invention was confined to the correlative arrangement of the numerous parts which he used. Against the background of the prior art, his arrangement was not entitled to a broad range of equivalents. And the defendant has used a simplified and improved arrangement, dispensing with some of the parts which Mead found necessary.

As against the two Cohen patents in suit, Mead and Cope-land constitute prior art. Definitely Cohen was not the first to incorporate the automatic feature of bimetal heat control into an operative electric cigar lighter. Altogether it appears to me that Cohen's achievement, skillful though it was, at least with respect to the claims in suit fell short of patentable invention.

14. The defendant is entitled to a decree dismissing the complaint, with costs, and may submit such a decree for entry.

Dated at New Haven this 7th day of June, 1940.

C. C. Hincks, United States District Judge.

[fol. 568] IN UNITED STATES DISTRICT COURT

FINAL DECREE—Filed June 19, 1940

This cause having come on to be heard at final hearing before the Court, in the Federal Building, at New Haven, Connecticut, on November 2nd and 3rd, 1939, upon the testimony of witnesses called by the respective parties, and upon the exhibits, records and proceedings, and counsel for the respective parties having been heard, and briefs of the respective parties having been filed, and the Court being fully advised in the premises and having jurisdiction over the parties and subject matter, and the Court having made certain Findings of Fact and Conclusions of Law dated June 7, 1940, it is now

Ordered, Adjudged and Decreed as follows:

1. That the Plaintiff, The Automatic Devices Corporation, a corporation of Connecticut, is a patent holding company and the owner by mesne assignments of United States Letters Patent No. 1,736,544 issued Nov. 19, 1929, to Herbert E. Mead, assignor to S. T. Jessop Co., Inc., an Illinois Corporation, Patent No. 2,117,232 issued May 10, 1938, to Joseph H. Cohen assignor to The Automatic Devices Corporation, and Patent No. 2,140,311 issued December 13, 1939, to Joseph H. Cohen assignor to The Automatic Devices Corporation.
2. That Casco Products Corporation, a corporation of Connecticut, is the licensee of the Plaintiff under said United States Letters Patent Nos. 1,736,544, 2,117,232 and 2,140,311 and that said Casco Products Corporation paid the expenses of Plaintiff in this cause of action.
3. That claims 1, 2, 3 and 11 of United States Letters Patent No. 1,736,544 if valid are not infringed by defendant's device in suit illustrated by the drawing marked [fol. 569] "Plaintiff's Exhibit 1A" in evidence, photostat of said drawing being annexed hereto.
4. That claims 1, 2, 10, 16 and 18 of United States Letters Patent No. 2,117,232 issued to Joseph H. Cohen assignor to The Automatic Devices Corporation are invalid for lack of patentable invention.
5. That claims 3 and 20 of United States Letters Patent No. 2,140,311 issued to Joseph H. Cohen assignor to The

Automatic Devices Corporation are invalid for lack of patentable invention.

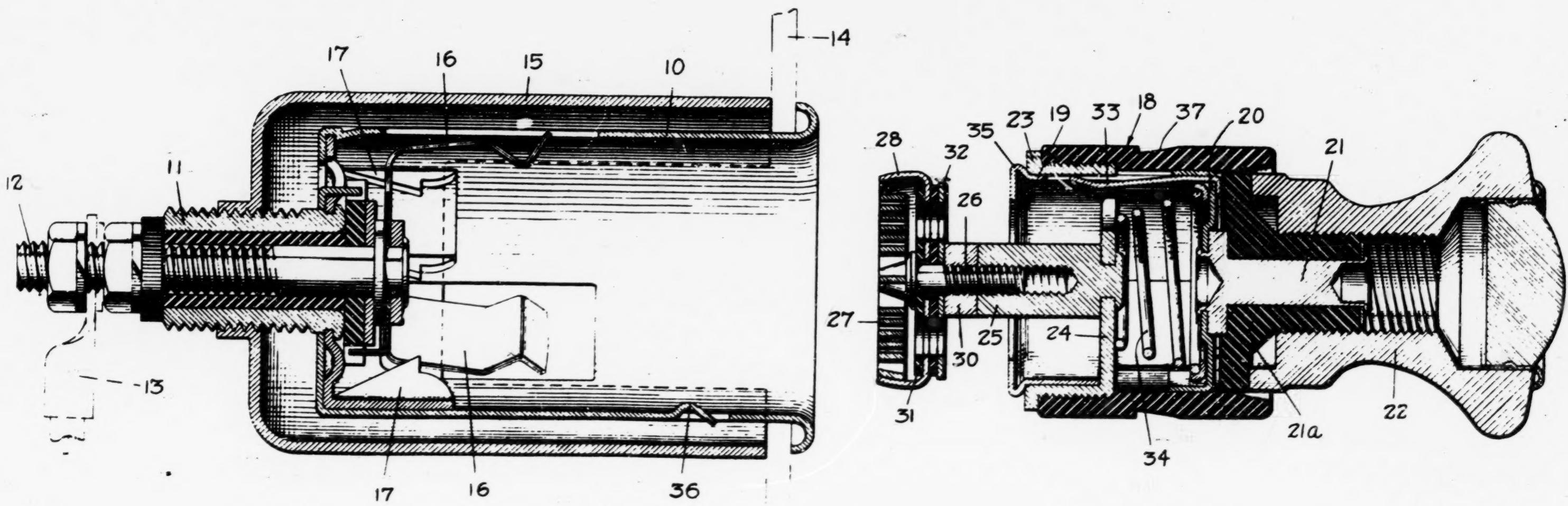
6. That the defendant has not infringed upon any valid rights of the plaintiff.
7. That the bill of complaint herein be and the same hereby is dismissed.
8. That defendant recover of the plaintiff its costs and disbursements of this suit to be taxed by the Clerk, and that defendant have execution therefor against the Plaintiff.

(Sgd.) C. C. Hincks, United States District Court.

Dated: New Haven, Conn., June 19, 1940.

(Here Follows 1 Photolithograph, Side Folio 570)



Exhibit 1A

[fol. 571] UNITED STATES DISTRICT COURT, DISTRICT OF CONNECTICUT

[Title omitted]

NOTICE OF APPEAL

SIRS:

Notice is hereby given that The Automatic Devices Corporation, plaintiff in the above-identified action, does hereby appeal under and in accordance with the provisions of the Statutes and Rule 73 of the Rules of Civil Procedure for the District Courts of the United States to the United States Circuit Court of Appeals for the Second Circuit from the provisions of paragraphs numbered 3, 4, 5, 6, 7 and 8 of the judgment entitled "Final Decree" which was signed and entered in the above-entitled action on the 19th day of June, 1940.

The Automatic Devices Corporation, By James T. Kline, George F. Smyth, Attorneys, 945 Main Street, Bridgeport, Conn.

Dated: August 21, 1940.

To: Clarence W. Bronson, Esq., and Charles M. Lyman, Esq., Attorneys for Defendant, 129 Church Street, New Haven, Conn.

[fol. 572] IN UNITED STATES DISTRICT COURT

[Title omitted]

STIPULATION DESIGNATING CONTENTS OF RECORD ON APPEAL

Now comes plaintiff in the above-entitled action, The Automatic Devices Corporation, by its attorneys, James T. Kline and George F. Smyth, of 945 Main Street, Bridgeport, Connecticut, under and in accordance with the provisions of Rule 75 (a) of the Rules of Civil Procedure for the District Courts of the United States and designates the following as the portions of the record, proceedings and evidence to be contained in the record on appeal (* * * more than one copy of any document to be excluded * * *) of plaintiff from the judgment (designated "Final Decree") of this Court which was signed and entered on the 19th

day of June, 1940, to the United States Circuit Court of Appeals for the Second Circuit:

1. Statement in Compliance with Rule 13, Paragraph 4 of the United States Circuit Court of Appeals for the Second Circuit.

2. Bill of Complaint.

3. Plaintiff's Bill of Particulars.

4. Answer of Defendant.

5. Stipulation and Order Amending Answer.

[fol. 573] 6. Minutes of Trial as Follows:

Frontispiece P. 1

Plaintiff's Prima Facie Case

1. Offer of certain of Plaintiff's Exhibits	P. 20, line 12 thru P. 30
2. Testimony of Johnson	Pp. 31 thru 83
3. Testimony of Cohen	Pp. 86 thru 117
4. Testimony of Cuno	Pp. 118 thru 151 Pp. 152 thru 155, line 16

Defendant's Proof

5. Offer of certain of Defendant's Exhibits	P. 155, line 17 thru P. 159
6. Testimony of Cuno	Pp. 160 thru 172B
7. Testimony of Wolfson	Pp. 173 thru 262
8. Discussion of patents in book	Pp. 267 thru 288A

Plaintiff's Rebuttal

9. Offer of certain of Plaintiff's Exhibits	Pp. 289 thru 294
10. Testimony of Head	Pp. 295 thru 331, line 11
11. Offer of Jessop lists	P. 331, line 12 thru P. 332
12. Continuation of Testimony of Head	Pp. 333 thru 334
13. Testimony of Johnson	Pp. 335 thru 367, line 3
14. Exhibit 7 and Exhibit C inserted	P. 367, the sentence in lines 4 thru 7 P. 369, line 3, thru P. 372, line 23

[fol. 574] 7. Stipulation and testimony of Herbert E. Mead, Adam John Dunsmore, George W. Johnson, and Sidney Thomas Jessop, taken in the suit brought by plaintiff herein against Sinko Tool & Mfg. Co. in the District Court of the United States for the Northern District of Illinois, Eastern Division, in Equity No. 16,188.

8. Plaintiff's Exhibits:

1. Three drawings of Cuno Automatic Cigar Lighter.
 - 1-A. Drawing of Cuno Automatic Cigar Lighter.
 - 1-B. Drawing of Cuno Automatic Cigar Lighter.
 - 1-C. Drawing of Cuno Automatic Cigar Lighter.
3. License agreements between Automatic Devices Corporation and Casco Products Corporation.
4. Copy of Mead patent No. 1,736,544.
5. Copy of first Cohen patent No. 2,140,311.
6. Copy of second Cohen patent No. 2,117,232.
28. Photostatic copy of front page and page 480 of Montgomery Ward Catalog for Spring and Summer of 1929.
29. Cuno chart—re sales.
 - 29-A. Copy of Smith British Patent No. 285,200.
31. Plaintiff's Exhibit 30 of Sinko case. (Bill of Sale.)
32. Plaintiff's Exhibit 31 of Sinko case. (Five sheets made by Mead.)
34. Plaintiff's Exhibit 34 of Sinko case. (List of tools.)
36. Plaintiff's Exhibit 36 of Sinko case. (Montgomery Ward Catalog.)
38. Photograph of Exhibit 33 of Sinko case. (Cigar lighter model.)

[fol. 575] 39. List headed "Shipments of Jesco Automatch as Indicated by Invoices of S. T. Jessop Company, Incorporated.

9. Defendant's Exhibits:

- B. Drawing of Casco Commercial lighter.
- C. Print of one of the form of the Mead device.
- E. "Saturday Evening Post" advertisement.
- F. Sample of trade paper advertisement.
- H. Four sheets, loose-leaf catalog sheets.
- L. Copies of prior art patents (portion relied upon).

Patent Numbers	Name	Date
493,380	Hammarstrom	Mar. 14, 1893
852,326	Harley	Apr. 30, 1907
1,025,852	Andrews	May 7, 1912
1,143,572	Denhard	June 15, 1915
1,294,045	Cavanagh	Feb. 11, 1919
1,318,168	Newsom	Oct. 7, 1919
1,372,207	Stahl	Mar. 22, 1921
1,373,583	Adams	Apr. 5, 1921
1,376,154	Morris	Apr. 26, 1921
1,437,701	Zecchini	Dec. 5, 1922
1,540,628	Hurxthal, et al.	June 2, 1925
1,622,334	Metzger	Mar. 29, 1927
1,697,686	Langos	Jan. 1, 1929
1,732,784	Wolfson, et al.	Oct. 22, 1929
1,757,255	Mahan	May 6, 1930
1,838,363	Copeland	Dec. 29, 1931
1,844,206	Copeland	Feb. 9, 1932
1,944,925	Cohen	Jan. 30, 1934
1,980,157	Wolfson	Nov. 6, 1934
2,060,783	Ashton	Nov. 17, 1936
2,084,966	Ashton	June 22, 1937
2,117,703	Cohen	May 17, 1938
Br. 298,073	Rupps	May 9, 1929

[fol. 576] 10. Stipulated extract of file wrappers of Mead, Patent No. 1,736,544; Cohen, Patent No. 2,140,311; and Cohen, Patent No. 2,117,232.

11. Findings of fact and conclusions of law.
12. Judgment (marked Final Decree) which was signed and entered on the 19th day of June, 1940.
13. Notice of appeal.
14. Stipulation designating contents of record on appeal.
15. Stipulation regarding reproduction of Defendant's Exhibits E, F and H.
16. Stipulations extending time for completing appeal record.
17. The following exhibits of Plaintiff and Defendant are not those reproduced in the transcript of record, but are to be identified therein and submitted to the Clerk of the United States Circuit Court of Appeals for the Second Circuit as physical exhibits:

Plaintiff's Exhibits:

2. Accused cigar lighter manufactured by defendant.
7. Transcript of record in case of Automatic Devices Corporation v. Sinko Tool & Mfg. Co.
9. Enlarged drawing of Sheet 1 of Mead patent.
10. Animated model of Mead device.
11. Enlarged drawing of Sheet 2 of Mead patent.
12. Mead device (with outside spring).
- [fol. 577] 13. Mead device (with inside spring).
14. Enlargement of Sheet 1 of first Cohen patent No. 2,140,311.
15. Enlarged drawing of Sheet 2 of first Cohen patent.
16. Animated Model of first Cohen patent.
17. Casco non-automatic lighter.
18. Animated model of second Cohen patent No. 2,117,-232.
19. Casco automatic cigar lighter.
20. Enlarged drawing of second Cohen patent.
21. Enlarged drawing of Exhibit 1-A.
22. Animated model of defendant's device.
23. Enlarged drawing of Exhibit 1-B.
24. Enlarged drawing of Exhibit 1-C.
25. Enlarged drawing of commercial Casco Automatic Wireless Cigar Lighter.
26. Chart of Sale.
33. Plaintiff's Exhibit 32 of Sinko case. (Instruction Sheet.)
35. Plaintiff's Exhibit 35 of Sinko case. (Carton.)
37. Carton for Jesco Automatch Lighter.
41. Enlarged drawing of British Smith patent No. 285,-200.
42. Enlarged drawing of British Rupps patent No. 298,-073.

Defendant's Exhibits:

D. Early Cuno lighter.

G. Cigar lighter plug (Ford type).

I. File wrapper of Mead patent No. 1,736,544.

J. File wrapper of Cohen patent No. 2,140,311.

K. File wrapper of Cohen patent No. 2,117,232.

[fol. 578] L. Copies of prior art patents (portion not relied upon).

M. Cut-away sample (Cuno Automatic).
O. Sample of Wolfson patent No. 1,980,157.

It is stipulated and agreed by and between the attorneys for the parties herein, the Honorable Court consenting, that the foregoing shall constitute the contents of the record on appeal.

James T. Kline, George F. Smyth, Counsel for Plaintiff. R. S. Allyn, Counsel for Defendant.

Dated: August 28, 1940.

It is so ordered.

C. C. Hincks, United States District Judge.

[fol. 579] IN UNITED STATES DISTRICT COURT, DISTRICT OF CONNECTICUT

[Title omitted]

STIPULATION REGARDING RECORD ON APPEAL

It is hereby stipulated by and between counsel for the parties to the above-entitled action that, in connection with the appeal of plaintiff to be taken from the judgment of this Court in this action, Defendant's Exhibits E, F and H, which are produced in color, may be reproduced in the record in black and white instead of colors; and that an order to the foregoing effect may be entered without further notice to either party.

James T. Kline, George F. Smyth, Counsel for Plaintiff. R. S. Allyn, Counsel for Defendant.

Dated: August 28, 1940.

It is so ordered:

C. C. Hincks, United States District Judge.

[fol. 580] IN UNITED STATES DISTRICT COURT, DISTRICT OF CONNECTICUT

[Title omitted]

STIPULATION EXTENDING TIME FOR COMPLETING APPEAL RECORD

It is Stipulated by and between the parties, with the consent of the Court, that the appellant's time for filing the

record and briefs in the appeal taken on August 22, 1940, be extended for a period of thirty (30) days to October 31, 1940, inclusive.

James T. Kline, George F. Smyth, Attorneys for Plaintiff, 945 Main Street, Bridgeport, Connecticut.
R. S. Allyn, Counsel for Defendant.

Dated: August 28, 1940.

It is so ordered:

C. C. Hincks, United States District Judge.

[fol. 581] IN UNITED STATES DISTRICT COURT, DISTRICT OF CONNECTICUT

[Title omitted]

AFFIDAVIT OF JAMES T. KLINE

James T. Kline, being duly sworn, deposes and says, upon information and belief, that because of the large amount of testimony and the number of patents involved, the preparation of the record and briefs in the appeal taken August 22, 1940, will require more than the forty (40) days provided for by Rule 73 (g) Rules of Civil Procedure, and that it will be necessary to have an extension of time of thirty (30) days to complete the record and the brief to be filed therewith. Preparation of the record has already been started and the patent copies to be incorporated in the record have been ordered.

James T. Kline.

Subscribed and sworn to before me this 21st day of August, 1940. Minnie Pezzullo, Notary Public.

[fol. 582] IN UNITED STATES DISTRICT COURT, DISTRICT OF CONNECTICUT

[Title omitted]

STIPULATION AS TO RECORD

It is hereby stipulated and agreed, that the foregoing (in 2 vols.) is a true transcript of the record of the said

District Court in the above-entitled matter as agreed on by the parties.

Dated, October —, 1940.

James T. Kline, George F. Smyth, Counsel for Plaintiff. R. S. Allyn, Counsel for Defendant.

[fol. 583] Clerk's Certificate to foregoing transcript omitted in printing.

[fol. 584] IN UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT, OCTOBER TERM, 1940

No. 154

AUTOMATIC DEVICES CORPORATION, Appellant,

v.

THE CUNO ENGINEERING CORPORATION, Appellee

(Argued January 9, 1941. Decided February 3, 1941)

Appeal by the plaintiff from a judgment of the District Court for the District of Connecticut, dismissing a complaint in an action to enjoin the infringement of claims two, three and eleven of Patent No. 1,736,544, issued to Herbert E. Mead on November 19, 1929; and claims one, two, ten, sixteen, and eighteen of Patent No. 2,117,232, issued to Joseph H. Cohen on May 10, 1938.

Before: L. Hand, Augustus N. Hand and Chase, Circuit Judges

Drury W. Cooper for the appellant.
Robert S. Allyn for the appellee.

OPINION

[fol. 585] L. HAND, C. J.:

The plaintiff appeals from a judgment dismissing its complaint in an action to enjoin the infringement of two patents: i. e. claims two, three and eleven of Patent No. 1,736,544, issued to Herbert E. Mead; and claims one, two, ten, sixteen, and eighteen of No. 2,117,232, issued to Joseph

H. Cohen. The district judge held that Mead's patent was not infringed and that Cohen's patent was invalid. Both inventions are for improvements in cigar and cigarette lighters installed in motor-cars, containing a glow member heated by, or being itself, a resistance coil in an electric circuit from the igniter coil. When such lighters first appeared they were in form of plugs, carried in a socket on the dashboard and pulled out when used. Two wires from the igniter coil led to opposite ends of a resistance coil in the plug, and, when pulled taut, these closed an open contact in the circuit and heated the glow member. After the plug had been used the release of tension on the wires opened the contact, broke the circuit, and the wires were reeled back into the socket as the plug was returned. These were called "reel type" lighters; in them the plug was never out of the circuit. They were in use at least as early as 1917. In 1921 a patent was issued to one, Morris (No. 1,376,154), for another type, the "wireless" lighter, in which no wires were attached to the plug, which, when pulled out of the socket, kept hot only so long as it took the glow member to cool off. In this type, of which there were several forms, while the plug rested in the socket the contacts of the circuit were open, and when the user wished to use it he completed the circuit by pushing it home—preferably against the resistance of a spring—and he was obliged to hold it in place until the glow member was hot enough. After he concluded that it had become so (in some forms the glow member was visible) he took out the plug, used it like a match or torch, and returned it to the socket. These lighters required the continued attention [fol. 586] of the user, because it was essential that the plug should not close the circuit while the glow member was not to be heated, and that the circuit should not be closed for too long while it was. The record does not show how extensive was the use of these lighters before 1927 or 1928, when the plaintiff began to make them, except that they were already in great demand and much competition had developed among their manufacturers. Another device of the same sort appeared only a little more than a year after Morris (Zecchini, No. 1,437,701, Dec. 5, 1922); a third some six years later (Metzger, No. 1,622,334, March 29, 1927); and still a fourth less than a year before Mead's patent appeared (Langos No. 1,697,686, January 1, 1929). None of these differed basically from Morris, and they show that

during the seven intervening years the art had been making rather futile attempts at improving and refining upon his disclosure.

So far as appears, nobody in this country before Mead made "wireless" lighters automatic; that is to say, so that they should hold their position, after they had been manually made to close the circuit, should automatically break the circuit when the glow member got hot enough, and should give notice that the plug was ready for use. Smith filed a British application for an automatic "cut-out" by means of a thermostat in December, 1926 (Brit. Pat. 285,200 (1928)) but that we cannot consider (§ 72, Title 35, U. S. C.) because the patent did not issue until 1928. Rupp had a similar device (Brit. Pat. 298,073) but even his German filing date was after Mead's. The art had indeed for many years used thermostats to break a circuit when it got overcharged; such uses go back to 1893 (Hammarstrom, No. 493,380). Moreover thermostats had been installed as "cut-outs" in tools—e. g. in sadirons—fifteen years before Mead's application was filed (Andrews, No. 1,025,852). But these uses rather fortify than impair the invention; for, the more general and familiar was the use of a thermostat to [fol. 587] cut out an over-heated member in an electric current, the more curious it is that no one should have thought of its use to remedy the known defects of "wireless" lighters.

The only doubt, as it seems to us, that the prior art throws upon the invention arises from Copeland (No. 1,844,206) whose application was filed on April 18, 1927, four months before Mead's, and who was therefore a prior inventor. (Mead tried to carry his date back of April 18, 1927, and if it were an ordinary issue, we might agree that he succeeded, although the judge made no finding about it. Nor need we do so either; the standard in such cases is very exacting; and here no documentary evidence really corroborated the testimony of Mead and those who saw his work.) Copeland disclosed two forms of lighter, in both of which the cigar was inserted in a tube at the end of which was the glow member. In one form (figure two) the cigar was used to press the glow member against a spring and overset it, and thus to make a contact that completed the circuit; in the other form (figure six) a push-button, oper-

able by the user's thumb, directly overset the spring. In each form after the glow member had been properly heated a thermostat pushed back the spring to its first position and broke the circuit, at the same time giving notice to the user by putting out a light. (The thermostat was not actuated by the heat of the glow member as in Mead, but by a separate resistance coil so timed as to break the circuit at the proper moment. That was, however, a difference of detail in design on which Mead's invention cannot rest.) It must be owned that Copeland's figure six did disclose a lighter, manually operated, which, once put in operation, did not require continued pressure, which automatically cut out the current when the glow member was hot enough, and which advised the user of that fact. Moreover, very few structural changes were necessary to convert this into Mead's lighter. The "tubular extension 16" (page 1, line 71), which held the glow member, was already removable; it was only [fol. 588] necessary to make it accessible to the user and to attach the wiring to the "tubular guide, 11" (page 1, line 62). When that was done, the holder would become a "wireless lighter" quite as much as Morris's or his successors'. This is the strength of the defendant's argument which prevailed in the Seventh Circuit (Automatic Devices Corp. v. Sinko Tool & Mfg. Co., 112 Fed. (2) 335) and in the district court.

Nevertheless, it does not persuade us. Copeland's invention was still-born; it did not lead to the necessary modifications of Morris's lighter, nor did it suggest them; it was actually a step away from the "wireless" plug which is to be taken out, used like a match or a torch, and replaced, and which alone was capable of answering the needs of the art. Nor is it at all relevant that, after one had once thought of applying Copeland's arrangement to the plug type, the structural changes would have been simple. That is never the test; it is the conception that counts, the act of imagination which assembles the elements into the new and fruitful combination; not the working out of details. Potts v. Creager, 155 U. S. 597, 608; Regar & Sons v. Scott & Williams, 63 Fed. (2) 229, 231 (C. C. A. 2); Patent Royalties Corp. v. Land O'Lakes Creameries, 89 Fed. (2) 624, 627 (C. C. A. 2); Kelley v. Coe, 99 Fed. (2) 435, 440 (C. A. D. C.). Complicated machines, which are in the day's work for skilled mechanics, will appear magic to a tyro who may

find nothing but the obvious in a combination that has failed of discovery for a decade after the need arose. It would indeed be absurd to rate this as a major invention, yet it did bring to what appears to be its final form a contrivance which had become a standard fixture in motor cars; and upon every detail of these as much human ingenuity has been expended as perhaps on any machine. Just such trifles often help sales; in the severe competition of motor car industry the perfecting of even a trifling furnishing like this may be the object of study and experiment. The art itself shows that this has been true here, as we have already seen; [fol. 589] and the best test of what persons of routine ingenuity can do is what they have done. Perhaps, given the same technological stage of development, the same inventions are sure to appear and at about the same time, patents or no patents; but it is certainly unwarranted to assume that the small ones need less stimulus than the great ones; rather the contrary, for minds of the first order are more apt to express themselves without other inducement than the work itself. If patents are to go to those who contribute new appliances that are beyond the limited imagination of the ordinary skilled person, this invention seems to us to merit a patent.

The claims being valid and there being nothing in the prior art which requires it, we see no reason to circumscribe them closely to the disclosure. Verbally there is no difficulty. Invention lay in the general conception reduced, of course, to practice as shown but the range of equivalents should be as broad as the actual invention, as we have often said. There is nothing which turns primarily upon the precise details of the structure; the claims are good as they read, if good at all. We hold that they are valid and infringed.

As to the Cohen patent little need be said; here Mead is prior art and anticipates all that can be regarded as more than competent designing. We agree that the claims in suit are invalid.

As to Mead's patent, judgment reversed as to claims 2, 3 and 11 (plaintiff withdrew claim 1); as to Cohen's patent, judgment affirmed.

[fol. 590] [File endorsement omitted]

IN UNITED STATES CIRCUIT COURT OF APPEALS FOR THE
SECOND CIRCUIT

[Title omitted]

PETITION FOR CORRECTIONS AND FOR REHEARING—Filed February 17, 1941

To the Honorable the Judges of the United States Court of Appeals for the Second Circuit:

Factual Corrections

The Court's opinion has been carefully studied and appears to us to contain factual errors which we feel sure the Court will wish to eliminate.

Page 672 of the printed opinion, line 5, we request that a comma be inserted after "ten" and after the comma the word sixteen inserted. Claim 16 of Cohen 2,117,232 was before the Court.

Page 672, line 9, before "installed" might be inserted commonly. There is nothing in the claims of Mead limiting the invention to an installation on a motor car. In fact, Mead did not wish his invention so limited, lines 27-33 of page 4 of Mead patent (T. R. p. 360).

Page 672, lines 9 and 10, we request that the words "heated by, or being itself" be deleted and the words consisting of substituted. The possibility of the resistance coil or glow member being heated by something else than [fol. 591] the passage of the electric current through it does not appear to be in either patent.

Page 672, line 11, we request that the words "from the igniter coil" be omitted. The electric current is derived from any battery or generator and not from any igniter coil. The current for the lighter is independent of any ignition system of any motor car.

Page 672, lines 13 and 14, we request that the words "igniter coil" be removed and in place thereof the words the battery substituted for the reasons mentioned above in the preceding paragraph.

Page 672, lines 20 and 21, we request that "out of the circuit" be struck out and the words mechanically discon-

nected from the current supply wires substituted. When the circuit is broken as mentioned in line 18 of the Court's printed opinion the plug of a reel type lighter is out of the circuit.

Page 673, we request that all of line 2 and the words "was not to be heated, and that" in line 3 be removed. There was no problem or difficulty to avoid closing the circuit when the glow member was not to be heated, because the resistance of the spring (such as shown in Morris) referred to in lines 5 and 6 from the bottom of page 672 of the printed opinion would keep the ping from a circuit closing position.

Page 673, line 6, we request that "when the plaintiff began to make them" be cancelled. The record fails to show that the plaintiff ever manufactured any cigar lighters. It is a paper company—and receives no royalty or share of returns.

Page 673, line 6, we request that the comma after "1928" be changed to a period and the remainder of the sentence cancelled. The record is silent as to any great demand and as to any extensive competition in 1927 or 1928. Plaintiff's licensee, Casco Products Corporation, began the manufacture of non-automatic wireless lighters "about 1927 and 1928" (T. R. p. 94, fol. 282). It was not until 1928 and 1929 that competition became substantial (T. R. p. 96, fols. [fol. 592] 286, 287) in the manual type cordless lighters independently of Mead (T. R. p. 96, fol. 288). The chart (T. R. p. 381) shows sales of the manual type lighters (not Mead) beginning in 1934 and due to improvements later than Mead. All lighters included in this sales chart were manual or cordless or wireless type cigar lighters.

Page 673, line 17, greater accuracy would be obtainable if the following sentence be added at the end of the paragraph:

"The record shows that cordless lighters continued until the early thirties to be the subject of attempts at refining and improving them" (T. R. p. 381).

(See Wolfson 1,980,157 filed April 10, 1931, and Ashton Ford type lighter 2,060,783 filed October 8, 1934.)

Page 674, line 6, the patent number should be "1,844,206" and the date "April 18, 1927" (T. R. p. 489). It seems quite certain these are typographical errors.

Page 674, line 8, the date should be corrected to agree with the date in line 6 of the same page.

Page 675, lines 1 to 7, we do not read the Seventh Circuit opinion in the same way or feel that our argument was understood. The Mead claims do not require the supply wires to be disconnected as in a cordless lighter but are broad enough to include a reel type cord lighter as well as a cordless type lighter. Automatic Devices Corp. v. Sinko Tool & Mfg. Co., 112 F. (2d) 335 (340-341), C. C. A. 7 Mead makes no mention of the so-called advantages of a "wireless" or "cordless" lighter, expressly asked that his invention not be limited to the form shown (see lines 23 to 33, p. 4 of the patent T. R. p. 360), and nowhere indicated his desire for it to be limited to cordless lighters.

The Seventh Circuit Court held:

"we think his (Mead's) disclosures amounted to nothing more than mechanical skill and we think the claims herein relied upon are invalid" (p. 341, 112 Fed. Rep., 2nd Series).

[fol. 593] This statement followed a considerable discussion of the art not confined to Copeland or Morris. The Seventh Circuit Court also held:

"If there is novelty in the disclosures (of Mead) it must relate to the means which operate as a result of the rotary pressure, aside from the ultimate result of closing the switch, and we think the claims must be construed rather narrowly in order to avoid the prior art, if possible" (p. 340).

It is our contention that no invention was involved broadly in applying a thermostat and latch to such devices as Morris or employing direct heat from the coil in view of Copeland and other automatic heaters as found by the District Court (see T. R. p. 559) and that the Cuno lighter is radically different from the Mead disclosure and therefore does not infringe the vague and unclear claims in suit.

Claim 1 was obviously not infringed in its very terms as found by the District Court and was dropped at the argument before this Court. Claim 2 would have been more easily understood if read following claim 1 where there is similar wording. We have reference particularly to "means for moving said heating member" which according to claim 1 is "on said base member". Plaintiff contended that this was the knob and the District Court said:

"It is not sensible to direct this reference as plaintiff would have me do to the knob on the plug" (T. R. p. 557).

The District Court in Connecticut held:

"I have serious doubt whether Mead transcended the realm of design; whether in essence he did more than produce a new design for old parts having familiar functions, arranging for the co-operation of the several parts by means thoroughly familiar to one skilled in the general art of portable electrical appliances. But in any event, it is clear to me that if Mead's disclosure involved invention the only inherent invention was confined to the correlative arrangement [fol. 594] of the numerous parts which he used. Against the background of the prior art, his arrangement was not entitled to a broad range of equivalents. And the defendant has used a simplified and improved arrangement, dispensing with some of the parts which Mead found necessary" (T. R. pp. 566-567).

Page 675, lines 28 and 29, we request that the words "to what appears to be its final form" be struck out because contrary to the evidence. Not only was Mead's rotary socket and plug device unsuccessful with the spring inside the socket as shown in Fig. 15 (T. R. p. 249, fol. 747) but the form attempted to be marketed with a spring outside the socket where it was cooler was also unsuccessful (T. R. p. 127, fol. 380, and T. R. p. 251, fol. 753). Instead of the Mead device being anything like "final form", Mr. Cohen, the president of plaintiff's licensee, Casco Products Corporation, testified he had to make over 100 experiments before he got a successful and final form (T. R. p. 97, fol. 290), and put the Casco device on the market in 1936. Even then he had to follow Wolfson 1,980,157 (T. R. p. 497) owned by defendant-appellee (see the drawing in the appendix to plaintiff's brief). Plaintiff's licensee, Casco Products Corporation, was formerly licensed under this Wolfson patent.

Page 675, line 30. There was no evidence of the wireless lighter in any form having been either "a standard fixture in motor cars" or standard equipment before the Mead filing date. Plaintiff's licensee, Casco Products Corporation, began their manufacture "about 1927 and 1928" (T. R. p. 94, f. 282) and attracted competition in 1928 and 1929 (T. R. p. 96, ff. 286, 287), but not on the Mead device.

Page 676, in next to the last line, we request that after "reversed" and before the semi-colon the following be inserted--as to claims 2, 3 and 11 and affirmed as to claim 1.

Claim 1, which the District Court found not infringed, was included in the appeal but was dropped at the moment of argument of the appeal and therefore as to this claim judgment should be affirmed.

[fol. 595] Cohen's patent 2,140,311 was also included in the appeal but was dropped when the brief was filed. As to this patent we request that the judgment of the District Court be affirmed.

Petition for Rehearing as to the Mead Patent

The Court's opinion in this case is believed inconsistent with opinions of the United States Supreme Court and with a number of opinions of this Court of Appeals for the Second Circuit.

1. This opinion is believed contrary to the authority of *Permutit Co. v. Graver Co.*, 284 U. S. 52 (58, 60), because this opinion seems to have limited the claims of the Mead patent to a cordless or wireless type lighter. There is nothing in the claims in suit or the specification of the Mead patent about cordless or wireless lighters. We understand the Supreme Court to have ruled in the foregoing case that it was improper to limit a claim by the drawing only. The specification of Mead and the claims in suit are broad enough to cover other types than cordless lighters. This same rule has previously been applied by this Court, *Typewriters Hilliardized v. Corona Typewriter Co.*, 43 F. (2d) 961 (964), and also by the Supreme Court, *Howe Machine Co. v. National Needle Co.*, 134 U. S. 388 (397).

2. The Mead rotary plug and socket device was not successful. It made no substantial imprint upon the practical art. A great deal of development was later required before a radically different and successful device was obtained in 1936, and then only with the aid of the invention of defendant's Wolfson patent 1,980,157. It has been held that to give a broad construction to an impracticable device and make the inventor of a successful device pay tribute to one who does not substantially advance the art tends to discourage rather than promote the useful arts. *Deering v. Winona Harvester Works*, 155 U. S. 286 (295); *Lovell v. Seybold Mach. Co.*, 169 Fed. 288 (290) (C. C. A. 2).

The Court holds that "it is the conception that counts" and "Invention lay in the general conception reduced, of course, to practice as shown". We had supposed that this was not sufficient—but that the concept must be accompanied at least by a successful solution, which is not the case here. As we understand Potts v. Creager, 155 U. S. 597, 608, the defendant used substantially the same machine as the patent disclosure. In Regar & Sons v. Scott & Williams, 63 F. (2d) 229, 231 (C. C. A. 2), the patent was held invalid. In Patent Royalties Corp. v. Land O'Lakes Creameries, 89 F. (2d) 624, 627 (C. C. A. 2), and Kelley v. Coe, 99 F. (2d) 435, 440 (C. A. D. C.), there was almost immediate successful adoption.

3. In order that the Mead device may function in the manner described in lines 20 to 23 of page 673 of the printed opinion, this Court has found it necessary to interpret it as having a latch (not required by the claims) "so that they should hold their position after they have been manually made to close the circuit" (lines 19 to 21, p. 673 of the opinion). This Court has previously said it is improper to imply into a claim a limitation not expressly found, when that limitation is found in other claims, Kennedy v. Trimble, 99 F. (2d) 786 (788, column 1); Electric Machinery Mfg. Co. v. General Electric Co., 88 F. (2d) 11 (16). Claims 6, 8, 9, 10, 13 and 15, for example, expressly include the latch or equivalent means so that it should not be proper to say the inventor intended a latch to be implied in other claims.

In order that Mead "should give notice that the plug was ready for use" either visually by movement of the plug or audibly by such movement impinging upon a stop or abutment, it is necessary to read into claims 2 and 3 a limitation to a spring or other means for moving the plug, when such limitation is not found therein but occurs in other [fol. 597] claims, such for example as 6, 10, 11, 12, 13, 14 and 15.

Without the spring and latch being included, the claims are incomplete, not directed to a wireless type lighter, vague, and a mere double use of a thermostat to open an electric heater circuit.

4. Even if the Mead patent were to be regarded as valid it would seem desirable for this Court to consider the radical difference in construction, including the lack of movement of the glow member in defendant-appellee's construc-

tion, which the Seventh Circuit Court of Appeals believed sufficient to warrant a finding of non-infringement, 112 F. (2d) 335 (340), by Sinko's lighter which counsel for appellant has said was "substantially similar" to the Cuno lighter.

Wherefore, defendant-appellee requests either a rehearing or a reconsideration by this Court of its opinion of the Mead patent in view of the foregoing authorities.

Respectfully, Hyland R. Johns, Attorney for Defendant-Appellee.

Robert S. Allyn, of Counsel.

[fol. 598] IN UNITED STATES CIRCUIT COURT OF APPEALS FOR
THE SECOND CIRCUIT

AUTOMATIC DEVICES CORPORATION, Appellant,
v.

THE CUNO ENGINEERING CORPORATION, Appellee

February 27, 1941

Before L. Hand, Augustus N. Hand and Chase, Circuit
Judges

Robert S. Allyn for the appellee.

Per CURIAM:

Petition for rehearing denied.

C. J. J.

[fol. 599] IN UNITED STATES CIRCUIT COURT OF APPEALS,
SECOND CIRCUIT

AUTOMATIC DEVICES CORP., Plaintiff-Appellant,
v.

THE CUNO ENGINEERING CORP., Defendant-Appellee

ORDER DENYING PETITION FOR REHEARING—Filed February
27, 1941

A petition for a rehearing having been filed herein by
counsel for the appellee,

Upon consideration thereof, it is

Ordered that said petition be and hereby is denied.

D. E. Roberts, Clerk.

[fol. 600] [File endorsement omitted.]

[fol. 601] IN UNITED STATES CIRCUIT COURT OF APPEALS,
SECOND CIRCUIT

AUTOMATIC DEVICES CORP., Plaintiff-Appellant,

v.

THE CUNO ENGINEERING CORP., Defendant-Appellee

JUDGMENT—Filed March 10, 1941

Appeal from the District Court of the United States for the
District of Connecticut

This cause came on to be heard on the transcript of record
from the District Court of the United States for the District
of Connecticut, and was argued by counsel.

On Consideration Whereof, it is now hereby ordered, ad-
judged, and decreed that the judgment of said District
Court be and it hereby is reversed as to Mead's patent and
affirmed as to Cohen's patent.

It is further ordered that a Mandate issue to the said Dis-
trict Court in accordance with this decree.

D. E. Roberts, Clerk.

[fol. 602] [File endorsement omitted.]

[fol. 603] Clerk's Certificate to foregoing transcript omit-
ted in printing.

[fol. 604] SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed April 14, 1941

The petition herein for a writ of certiorari to the United
States Circuit Court of Appeals for the Second Circuit is
granted, limited to the question whether claims 2, 3, and 11
of the Mead patent No. 1,736,544 are valid, and the case is
assigned for hearing immediately following No. 277.

And it is further ordered that the duly certified copy of
the transcript of the proceedings below which accompanied
the petition shall be treated as though filed in response to
such writ.